APPENDICES

LEVEE SYSTEM INTEGRITY PROGRAM

LONG TERM LEVEE PROTECTION PLAN

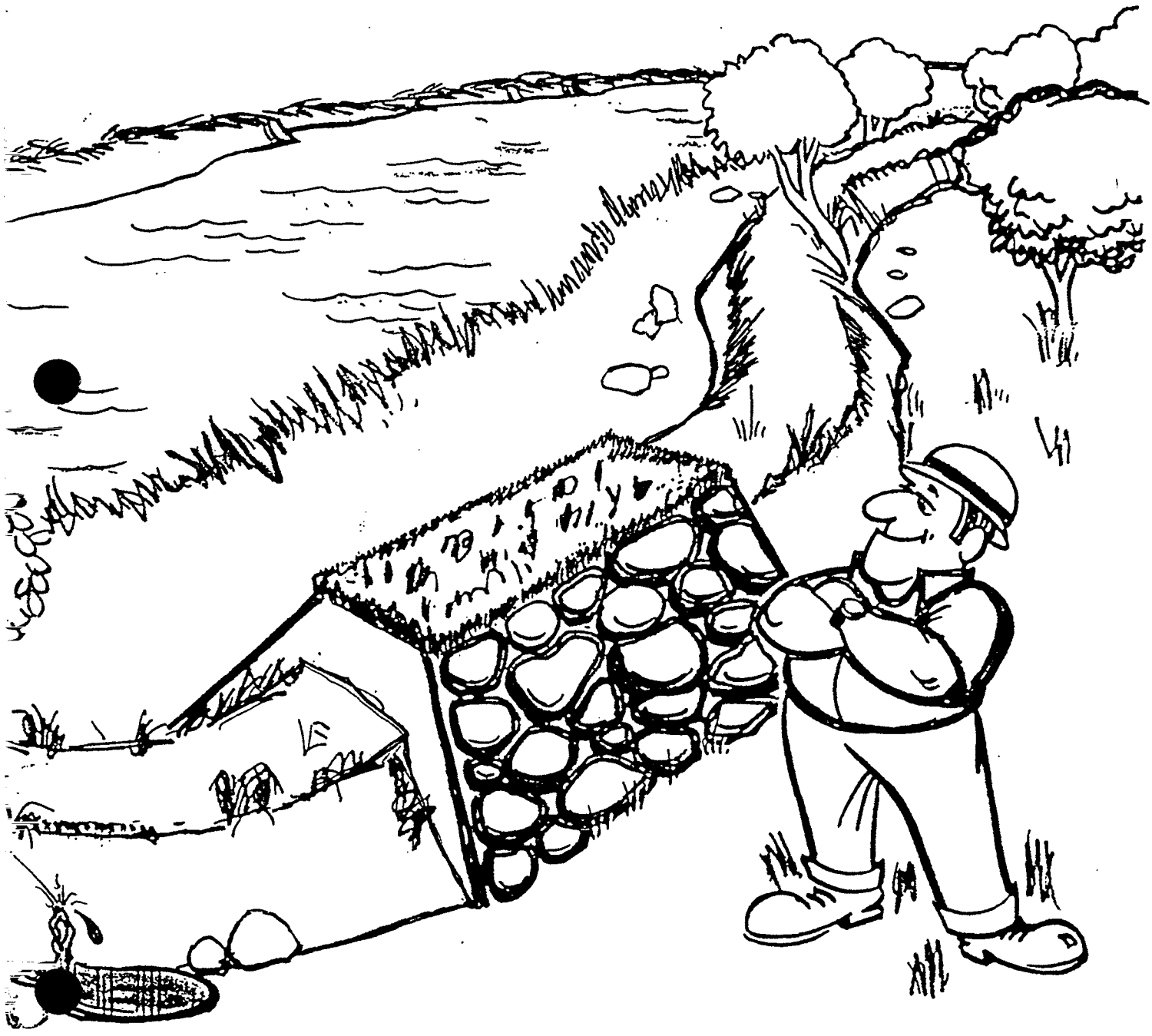
APPENDIX A

PL84-99 DELTA SPECIFIC STANDARD AND PL84-99 OVERVIEW

LEVEE SYSTEM INTEGRITY PROGRAM

LONG TERM LEVEE PROTECTION PLAN

GUIDELINES FOR REHABILITATION OF NON-FEDERAL LEVEES - IN THE SACRAMENTO-SAN JOAQUIN LEGAL DELTA



D-031921

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

24 MAR 1988

CECW-OE-D

MEMORANDUM FOR: Commander, South Pacific Division

SUBJECT: Non-Federal Levee Rehabilitation in the Sacramento-San Joaquin Legal Delta under the Provisions of PL 84-99, as amended

1. Reference: Memorandum with enclosures, CESPD-CO-E, 30 November 1987, sab.

2. The proposed eligibility guidelines are approved subject to the following conditions:

a. The PL 84-99 rating guide dated 2 December 1987, which superseded the 30 June 1987 version, will be used in the final eligibility guidelines.

b. General dewatering of inundated tracts as a result of levee failure will not be considered as eligible work under Corps rehabilitation project as it is rightfully a non-federal responsibility. Costs associated with dewatering the immediate construction area for the purpose of levee embankment repair is eligible for consideration.

3. Implementation of the new guidelines must always focus on our common objective to ensure consistent application of the emergency authority to all eligible applicants where the Federal interest and flood protection are of paramount concern. This position must be clearly transmitted to all interested parties.

FOR THE COMMANDER:

JOHN P. ELMORE
Chief, Operations and Readiness Division
Directorate of Civil Works

(1)

D-031922

D-031922

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
630 Sansome Street, Room 720
San Francisco, California 94111-2206

REPLY TO
ATTENTION OF:

CESPD-CO-E

24 Sept 1987

MEMORANDUM FOR: Commander, HQUSACE, ATTN: DAEN-CWO-EO, 20 Mass. Ave, N.W. Wash D.C., 20314-1000

SUBJECT: Non-Federal Levee Rehabilitation in the Sacramento-San Joaquin Legal Delta under the Provisions of PL 84-99, as amended.

1. The Corps position on rehabilitation of non-Federal levees within the Sacramento-San Joaquin Delta was defined in a February 1980 PL 84-99 policy statement by Commander, HQUSACE, Lieutenant General John W. Morris. General Morris stated that since non-Federal Delta levees were built for tidal and not flood control they could not be rehabilitated under PL 84-99 authority. Director of Civil Works Major General John F. Wall reviewed this policy in May of 1984 and added that if local interests upgraded these tidal levees to meet appropriate flood control standards they may be considered for rehabilitation assistance. General Wall also stated that SPD may have to develop Delta exclusive standards for any levee upgrade by locals.

2. Based on the above policy guidance Sacramento District has developed Delta exclusive standards (Encl 3) for non-Federal levees to qualify for rehabilitation under PL-84-99. I concur with the District's proposal with the following stipulations:

a. It is agreed to view FEMA's short-term hazard mitigation plan for the Delta (valid through 1991) as the interim Federal guideline for Delta levees. These guidelines would apply to eligibility for Federal assistance under PL 93-288 only.

b. The long-term solution to eligibility to Corps emergency assistance in the Delta will be based on eligibility guidelines for rehabilitation under PL 84-99 as coordinated between the State and Corps. This is consistent with FEMA's expectations.

c. The Corps accepts the established State standards for level of protection and freeboard in the Delta (State long-term subvention program as expressed in State Pub 192.82.) However, geotech standards must also be addressed to establish eligibility for Corps rehabilitation assistance. The geotech/stability screening process developed by SPK will be proposed to the State for their consideration. An option must be included for levee sponsors to do their own analysis to reclaima if desired.

d. SPK's proposed definition of a flood event in the Delta appears reasonable for eligibility purposes, provided it is understood that the Division Commander retains the purogative to judge individual events based on specific H&H data.

3. This document is forwarded for your review and comment. A formal presentation on the proposal will be given to your staff if so requested.

(2)

D-031923

4. References:

a. MSG, DAEN-CWO-E, 271415 Feb 80, Subject: PL 84-99 Authority. (Encl 1 - Morris Policy on Delta)

b. First Endorsement, DAEN-CWO-EO, 1 May 84, Subject: Sacramento San Joaquin Delta, California. (Encl 2 - Wall Policy on Delta)

/S/

Enclosures (3)

PATRICK J. KELLY
Brigadier General, U.S. Army
Commanding

(3)

D-031924

CESPD-CO-E (CECW-OE-D/24 Mar 88) 1st End B. Edmisten/dah/556-3108
SUBJECT: Non-Federal Levee Rehabilitation in the Sacramento-San Joaquin Legal Delta under the Provisions of PL 84-99, as amended

DA, South Pacific Division, Corps of Engineers, 630 Sansome Street, Room 720, San Francisco, CA 94111-2206 13 April 1988

FOR: Sacramento District Emergency Management (CESPK-EM)

The proposed eligibility guidelines are approved subject to conditions stated in basic memorandum and those conditions listed in paragraph 2 of CESPD-CO-E Memorandum of 30 November 1987, same subject.

FOR THE COMMANDER:

DAVID L. FULTON, Chief
Construction-Operations Division

(4)

D-031925

D-031925

CESPK-EM (500) 4 September 1987

MEMORANDUM FOR: Commander, South Pacific Division

SUBJECT: Non-Federal Levee Rehabilitation in the Sacramento-San Joaquin Legal Delta under the Provisions of PL 84-99, as amended

1. Reference:

a. Letter, SPKEM, 1 May 1987.

b. Joint SPD/SPK Meeting, 2 September 1987.

c. DRAFT - Guidelines for Rehabilitation of non-Federal Levees in the Sacramento-San Joaquin Legal Delta, CA, 3 September 1987 (encl 1).

2. Purpose.

a. The purpose of this letter is to change the recommendations submitted by Reference 1.a. The changes are to those items discussed at the joint meeting (Reference 1.b.).

b. This letter also requests your approval to implement the subject guidelines.

3. General.

a. The Chief of Engineers and the South Pacific Division Engineer tasked the Sacramento District Engineer to develop Delta-exclusive standards for non-Federal levee upgrade, by local interests, to appropriate flood control standards that will result in their being eligible for consideration for repair under PL 84-99, as amended. The Delta-exclusive standards supplement the National Guidelines (33 CFR203) issued 16 July 1986.

b. The recommended guidelines are Delta-specific and they are not intended to establish design standards for the 537 miles of non-Federal levees in the Sacramento-San Joaquin legal Delta, but to provide uniform procedures to be used by the Corps of Engineers in determining eligibility under PL 84-99, as amended. These Delta-specific guidelines supplement the National Guidelines.

(5)

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c. The National Guidelines provide a maintenance inspection rating guide that is meant to be used for all non-Federal levees. That document plus the supplemental guidelines (recommended herein) and all existing PL 84-99 criteria will be used to qualify the non-Federal levees in the Sacramento-San Joaquin Delta for rehabilitation assistance.

4. Recommendations - Supplemental to the National Guidelines.

a. Non-Federal Levee Guidelines for structures in the Legal Delta to be considered flood control structures eligible to qualify for post-flood rehabilitation under PL 84-99, as amended, are as follows:

(1) 1.5 feet of freeboard above the 100-year flood stage for all islands/tracts.

(2) The 100-year flood stages are those stages developed by the Sacramento District for FEMA that are being used in their Flood Hazard Mitigation Plan, Sacramento-San Joaquin Delta, Disaster Declaration FEMA-758-DR-CA, 1986.

(3) The levee will have a 16-foot crown width with an all-weather patrol road.

(4) The minimum water side slope of the levee will be 1V:2H.

(5) The minimum land side slope of the levee will vary with the levee height and depth of peat (see encl 1). The levee stability charts were computed using an idealized levee section with 5 zones of materials and using a safety factor of 1.25. Public agencies whose levees do not fit into these guidelines may submit data/information prepared by an engineer registered in the fields of geotechnical, soils or civil that demonstrates their levees meet or exceed a 1.25 factor of safety.

(6) A levee toe drain will be located 30 feet landward from the landside levee toe.

b. The California State Water Code Section 12200 (dated 1959) has defined the boundary of the Delta and it is

CESPK-EM
SUBJECT: Non-Federal Levee Rehabilitation in the Sacramento-San Joaquin Legal Delta under the Provisions of PL 84-99, as amended

recommended that the Corps of Engineers adopt this boundary of the Delta for the purposes of administering the provisions of PL 84-99, as amended.

c. When any one of the following conditions is met, a determination will be made by the Sacramento District Engineer and concurred in by the South Pacific Division Engineer, for post-flood rehabilitation of non-Federal levees in the legal Delta.

(1) Antioch tidal gauge equals or exceeds 6.0 feet (1929 National Geodetic Vertical Datum) NGVD (about 25-year frequency), plus the combined flow in the Sacramento River and Yolo Bypass equals or exceeds 320,000 cfs (about 10-year frequency flow) at the latitude of the city of Sacramento, or

(2) Antioch tidal gauge equals or exceeds 6.0 feet NGVD (about 25-year frequency), plus the flows in the San Joaquin River at Vernalis equals or exceeds 28,000 cfs (about 10-year frequency rain flood), and the stage on the Mokelumne River at New Hope Landing equals or exceeds 11 feet NGVD (about 10-year frequency stage), or

(3) Antioch tidal gauge equals or exceeds 6.0 feet NGVD (about a 25-year frequency), plus the flow of any other river/stream into the legal Delta exceeds a 10-year frequency.

5. Subsequent to your approval to implement the subject Delta-specific guidelines, we have arranged to meet informally with FEMA, State OES, State DWR and State Reclamation Board officials to solicit their views. The meeting will be held at the Sacramento District office, Room No. 6543, on 30 September 1987 at 1300 hours.

Encl

WAYNE J. SCHOLL
COL, CE
Commanding

DD
GARRETT/pk
2539
JLC
CZARNECKY
SCHOLL
9/4

CF (w/encl):
CESPD-CO-E (6)
CESPK-ED
CESPK-PD
CESPK-CO
CESPK-EM (4)

3

cc:
Exec RF
EMD RF

(7)

D-031928

D-031928

CESPK-EM 3 September 1987

GUIDELINES FOR REHABILITATION OF NON-FEDERAL LEVEES IN THE SACRAMENTO-SAN JOAQUIN LEGAL DELTA, CA

1. In 1980, the Corps of Engineers stopped all rehabilitation assistance to non-Federal levees in Sacramento-San Joaquin Legal Delta under PL 84-99 until such time that the non-Federal levees could be considered flood-control levees that provide a dependable adequate degree of protection. Subsequently, the Corps of Engineers developed National Guidelines that were finalized and published in the Federal Register Vol. 48, No. 246, dated July 16, 1986. Those guidelines are supplemented by additional guidelines, contained in this document, that are specific to the Delta. The boundaries of the legal Delta are defined in the State of California Water Code Section 12200 dated 1959. All non-Federal levees in the legal Delta will be evaluated for eligibility for rehabilitation under the provisions of PL 84-99, as amended, when they meet the guidance provided herein.

2. Summary of changes to PL 84-99, as amended. These changes prescribe a set of minimum guidelines that non-Federal flood control projects must meet to be eligible for

consideration for rehabilitation under the provisions of PL 84-99. These guidelines address both maintenance and engineering criteria and revise the existing cost-sharing formula for non-Federal projects. The changes also include a requirement that all applications for rehabilitation of non-Federal projects have a public agency sponsor. The new cost-sharing requirements, effective immediately, establish an 80% Federal-20% non-Federal distribution of the construction cost of the rehabilitation of non-Federal flood control projects. Evaluations for eligibility, investigation of flood damages, engineering and rehabilitation design costs are borne by the Corps of Engineers.

3. The National Guidance for the technical and maintenance evaluation of non-Federal flood control facilities is attached as Appendix A.

4. The Delta-specific guidelines are supplemental to the National Guidelines and are as follows:

a. 1.5 feet of freeboard above the 100-year flood stage for all islands/tracts.

D-031930

b. The 100-year flood stages are shown on Appendix B. These are the same 100-year flood stages used for the Flood Hazard Mitigation Plan, Sacramento-San Joaquin Delta, Disaster Declaration FEMA-758-DR-CA, 1986.

c. The levee will have a 16-foot crown width with an all-weather patrol road.

d. The minimum water side slope of the levee will be 1V:2H.

e. The minimum land side slope of the levee will vary with the levee height and depth of peat (see Appendix D). The levee stability charts were computed using an idealized levee section with 5 zones of materials and using a safety factor of 1.25. Public agencies whose levees do not fit into these guidelines may submit data/information prepared by a registered engineer (geotechnical, soils, civil) that demonstrates their levees meet or exceed a 1.25 factor of safety.

f. A levee toe drain will be located 30 feet landward from the landside levee toe.

5. Public agencies may request an evaluation of their non-Federal levee system by providing the following information to U.S. Army Corps of Engineers, ATTN: Emergency Management Division, 650 Capitol Mall, Sacramento, CA 95814-4794.

a. Name of Island/Tract, point of contact, telephone number and address.

b. Furnish centerline profile and cross-sections of the levee at a minimum of 1,000 feet intervals.

c. If applicable, certification data of a 1.25 factor of safety.

6. When any one of the following conditions is met, a determination will be made by the Sacramento District Engineer and concurred in by the South Pacific Division Engineer for post-flood rehabilitation of non-Federal levees in the legal Delta.

a. Antioch tidal gauge equals or exceeds 6.0 feet (1929 National Geodetic Vertical Datum) NGVD (about 25-year frequency), plus the combined flow in the Sacramento River and Yolo Bypass equals or exceeds 320,000 cfs (about 10-year frequency flow) at the latitude of the city of Sacramento or

b. Antioch tidal gauge equals or exceeds 6.0 feet NGVD (about 25-year frequency), plus the flows in the San Joaquin River at Vernalis equals or exceeds 28,000 cfs (about 10-year frequency rain flood), and the stage on the Mokelumne River at New Hope Landing equals or exceeds 11 feet NGVD (about 10-year frequency stage), or

c. Antioch tidal gauge equals or exceeds 6.0 feet NGVD (about a 25-year frequency), plus the flow of any river/stream into the legal Delta exceeds a 10-year frequency.

Atchs

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APPENDICES

Appendix	Description
A	Levee Rating Guide
B	Map of 100-year Flood Stages in the Delta
C	Peat Thickness Map
D	Minimum Landside Levee Configuration

Rating codes:

A- Acceptable Performance Level
M- Minimally Acceptable Performance Level
U- Unacceptable Performance Level

ITEM	RATING GUIDE	
1.	**Level of Protection**	A- The designed section is for an exceedance frequency greater than 10% chance (10 yr.) with minimum freeboard of 2 feet.
		M- The designed section is for an exceedance frequency between 20% to 10% chance (5-10 yr) with minimum freeboard of 1 foot.
		U- The designed section is less than the minimum required for an M rating.
2.	**Erosion Control**	A- Erosion protection in active areas is capable of handling the designed flow velocity for the level of protection for the entire FCW.
		M- Erosion protection is capable of handling the designed flow velocity for the level of protection for 75% or more of the FCW.
		U- Erosion protection measures protects less than 75% of the FCW; or if erosion protection was not provided and there is evidence indicating a need for erosion protection.
3.	**Embankment**	A- Fill material for embankment is suitable to prevent slides and seepage for the existing side slopes. Fill material is uniform and adequately compacted through the entire FCW.
		M- Material is adequate and suitable to prevent major slides and capable of handling localized seepage for the existing side slopes. Fill material is uniform and adequately compacted in 75% or more of the FCW.
		U- Material is unsuitable and likely to cause numerous slides and allow excessive uncontrolled seepage. Fill material is not uniform, or there is no compaction and evidence indicates a need for compaction.
4.	**Foundation**	A- Foundation materials will not cause piping, sand boils, seepage, or settlements which reduce the level of protection.
		M- Foundation materials may show signs of excessive seepage, minor sand boils, and localized settlements.
		U- Foundation materials are unsuitable and likely to cause excessive uncontrolled seepage, sand boils, and piping.

Figure E-2. Engineering Guide

(14)

D-031935

5.	**Structures**	A- Structures are capable of performing their design functions and show no signs of failure.
		M- Structures are performing their design functions but show signs of overtopping and bypassing flows.
		U- Structures are not performing their design functions or show signs of structural failure.

Figure E-2. Engineering Guide (Cont'd)

(15)

E-5. Maintenance Compliance Guide. This guide (Figure E-3) is used to assign a rating for maintenance compliance during the Initial Eligibility Inspection and the Continuing Eligibility Inspection. The evaluation should reflect the level of maintenance required to insure the intended degree of flood protection and actions required by the owner/sponsor for a FCW to remain eligible for the rehabilitation program under PL 84-99.

Rating codes:

A- Acceptable Performance Level
M- Minimally Acceptable Performance Level
U- Unacceptable Performance Level

ITEM	RATING GUIDE		
1.	**Depressions**	A-	Minimal depressions or potholes; proper drainage.
		M-	Some depressions that will not pond water.
		U-	Depressions 6" vertical or greater which endangers the integrity of the levee.
2.	**Erosion**	A-	No erosion observed.
		M-	LEVEES: Erosion of levee crown or slopes that will not interrupt inspection or maintenance access. OTHER: Erosion gullies less than 6 inches deep or deviation of 1 foot from designed grade or section.
		U-	LEVEE: Erosion of levee crown or slopes that has interrupted inspection or maintenance access. OTHER: Erosion gullies greater than 6 inches or deviation of 1 foot or more from designed grade or section.
3.	**Slope Stability**	A-	No slides present, or erosion of slopes more than 4" deep.
		M-	Minor superficial sliding that with deferred repair does not pose an immediate threat to FCW integrity. No displacement or bulges.
		U-	Evidence of deep seated sliding (2 ft. vertical or greater) requiring repairs to re-establish FCW integrity.
4.	**Cracking**	A-	No cracks in transverse or longitudinal direction observed in the FCW.
		M-	Longitudinal cracks are no longer than the levee height. No displacement and bulging. No transverse cracks observed.
		U-	Longitudinal cracks are greater than levee height with some bulging observed. Transverse cracks are evident.

Figure E-3. Maintenance Compliance Guide

(16)

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5.	**Animal Burrows**	A-	Continuous animal burrow control program that eliminates any active burrowing in a short period of time.
		M-	Animal burrows present that will not result in seepage or slope stability problems.
		U-	Animal burrows present that would result in possible seepage or slope stability problems.
6.	**Unwanted Levee Growth**	A-	No large brush or trees exist in the FCW. Grass cover well maintained. CHANNELS: Channel capacity for designed flows is not affected.
		M-	Minimal tree (2" diameter or smaller) and brush cover present that will not threaten FCW integrity. (NOTE: Trees that have been cut and removed from levees should have their roots excavated and the cavity filled and compacted with impervious material). CHANNELS: Channel capacity for designed flows is not adversely affected.
		U-	Tree, weed and brush cover exists in the FCW requiring removal to re-establish or ascertain FCW integrity. (NOTE: If significant growth on levees exists, prohibiting rating of other levee inspection items, then the inspection should be ended until this item is corrected.) CHANNEL: Channel obstructions have impaired the floodway capacity and hydraulic effectiveness.
7.	**Encroachments**	A-	No trash, debris, excavations, structures, or other obstructions present.
		M-	Trash, debris, excavations, structures, or other obstructions present or inappropriate activities occurring that will not inhibit operations and maintenance performance.
		U-	Trash, debris, excavations, structures or other obstructions present or inappropriate activities that would inhibit operations and maintenance performance.
8.	**Riprap/Revetment**	A-	Existing protection works which is properly maintained and undamaged.
		M-	No scouring activity that could undercut banks, erode embankments, or restrict desired channel flow.
		U-	Meandering and/or scour activity that is undercutting banks, eroding embankments (such as levees), or impairs channel flows by causing turbulence, meandering or shoaling.

Figure E-3. Maintenance Compliance Guide (Cont'd)

(17)

D-031938

9.	**Stability of Concrete Structures**	A- Tilting, sliding or settling of structures, that has been secured which preserves the integrity or performance.
		M- Uncorrected sliding or settlement of structures of a magnitude that doesn't affect performance.
		U- Tilting or settlement of structures that has resulted with a threat to the structure's integrity and performance.
10.	Concrete Surfaces	A- Negligible spalling or scaling. No cracks present that are not controlled by reinforcing steel or that cause integrity deterioration or result in inadequate structure performance.
		M- Spalling, scaling and cracking present but immediate integrity or performance of structure not threatened.
		U- Surface deterioration or deep, controlled cracks present that result in an unreliable structure.
11.	**Structural Foundations**	A- No scouring or undermining near the structures.
		M- Scouring near the footing of the structure but not close enough to impact structure stability during the next flood event.
		U- Scouring or undermining at the foundation which has impacted structure integrity.
12.	Culverts	A- [a] No breaks, holes, cracks in the culvert that would result in any significant water leakage. No surface distress that could result in permanent damage. [b] Negligible debris or silt blocking culvert section. None or minimal debris or sediment present which has negligible effect on operations of the culvert.
		M- [a] Culvert integrity not threatened by spalls, scales or surface rusting. Cracks are present but resulting leakage is not impacting the structure. [b] Debris or sediment present, which is proposed to be removed prior to the next flood event, that minimally affects the operations of the culvert.
		U- [a] Culvert has deterioration such as surface distress and/or has significant leakage in quantity or degree to threaten integrity. [b] Accumulated debris or settlement which has not been annually removed and severely affects the operations of the culvert.

Figure E-3. Maintenance Compliance Guide (Cont'd)

(18)

D-031939

13.	**Gates**	A-	Gates open easily and close to a tight seal. Materials do not have permanent corrosion damage and appear to have historically been maintained adequately.
		M-	Gates operate but leak when closed, however, leakage quantity is not a threat to performance. All appurtenances of the facility are in satisfactory condition.
		U-	Gates leak significantly when closed or don't operate. Gates and appurtenances have damages which threaten integrity and/or appear not to have been maintained adequately.
14.	**Closure Structures**	A-	Closure structure in good repair. Placing equipment readily available at all times.
		U-	Closure structure in poor condition. Parts missing. Placing equipment may not be available within normal warning time.
15.	**Pumps and Motors**	A-	All pumps and motors are operational. Preventive maintenance is occurring and system is periodically subject to performance testing.
		M-	All pumps are operational and minor discrepancies are such that pumps could be expected to perform through the next projected period of usage.
		U-	Pumps are not operational, or noted discrepancies have not been corrected.
16.	**Power**	A-	Adequate, reliable, and enough capacity to meet demands.
		U-	Power source not considered reliable to sustain operations during flood condition.
17.	**Pump Control System**	A-	Operational and maintained free of damage, corrosion or other debris.
		M-	Operational with minor discrepancies.
		U-	Not operational, or uncorrected noted discrepancies.
18.	**Metallic Items**	A-	All metal parts in a plant/building protected from permanent damage from corrosion. Trash racks free from damage/debris and are capable of being cleared, if required, during operation. Gates operable.
		M-	Corrosion on metal parts appears maintainable. Trash racks free from damage and minimum debris present, and capable of being cleared before next flood event or during operation. Gates operable.
		U-	Metal parts need replacement. Trash racks damaged, have accumulated debris that have not been cleared annually or cannot be cleared during operation.

Figure E-3. Maintenance Compliance Guide (Cont'd)

D-031940

19.	Sumps	A- Clear of debris and obstructions, and mechanisms are in place to maintain this condition during operation.
		M- Clear of large debris and minor obstructions present and mechanisms are in place to deter further accumulation during operation.
		U- Large debris or major obstructions present in sump or no mechanism exists to prevent debris accumulation during operation.

Figure E-3. Maintenance Compliance Guide (Cont'd)

Figure I-2

MINIMUM ELIGIBILITY INSPECTION DATA

1. SPONSOR/OWNER INFORMATION

Name of Applicant/Requestor
Levee Location, River, stream, river mile and bank
City, County, State
Name, Address, Phone, point of contact.
POC phone of both Levee Owner and Sponsor.

2. INTRODUCTION

Should list authority for inspection (e.g., PL 84-99), purpose and scope of the inspection.

32. PROJECT INFORMATION

a. Identification:

Project ID number
River Basin and levee or drainage district
Previous repair history such as costs, dates and by whom
River or Creek bank and mile.

b. Classification:

Project purpose (flood control, land reclamation, etc.)
Type levee (primary, secondary, setback, etc.)
Complete/incomplete/operational/ abandoned, etc.

c. Economic Protection Provided:

Total area protected
Land usage and Percent
Cropping pattern
Value of property protected
Facilities protected
Historic flood damages, cite year and amount
Frequency of event.

d. Design Data:

Height: top width
Riverward and landward side slopes
Estimated level of protection (percentage)
Overtopping elevation
Gage data if available
Type of levee construction material
Erosion protection
Interior Drainage

4. FIELD INSPECTION DATA (Based on Rating Guide)

Identify inspection team
Summary of results of observations

5. EVALUATION

a. Structural and Geotechnical:

General Description of levee embankment features
Foundation condition
Stability and Seepage

b. Hydrology and Hydraulics:

Level of protection
Erosion Protection

c. Comments on Operation and Maintenance:

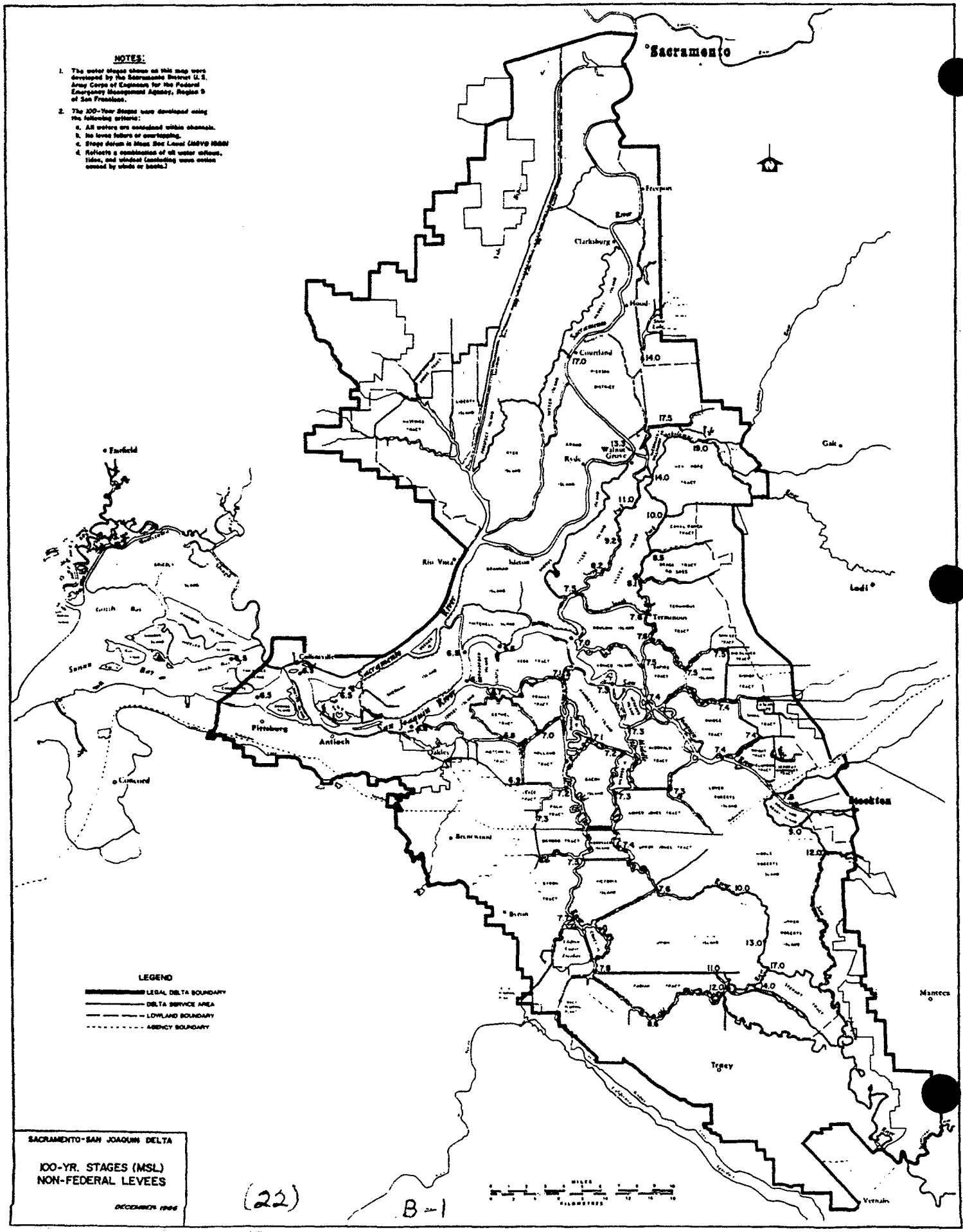
6. RECOMMENDATIONS

7. LIST OF ATTACHMENTS:

8. SIGNATURES:

Report should be signed by a representative of each discipline.

9. Each division/district shall develop a standard form (approved as required by local Information Management element) for use in documenting these inspections.



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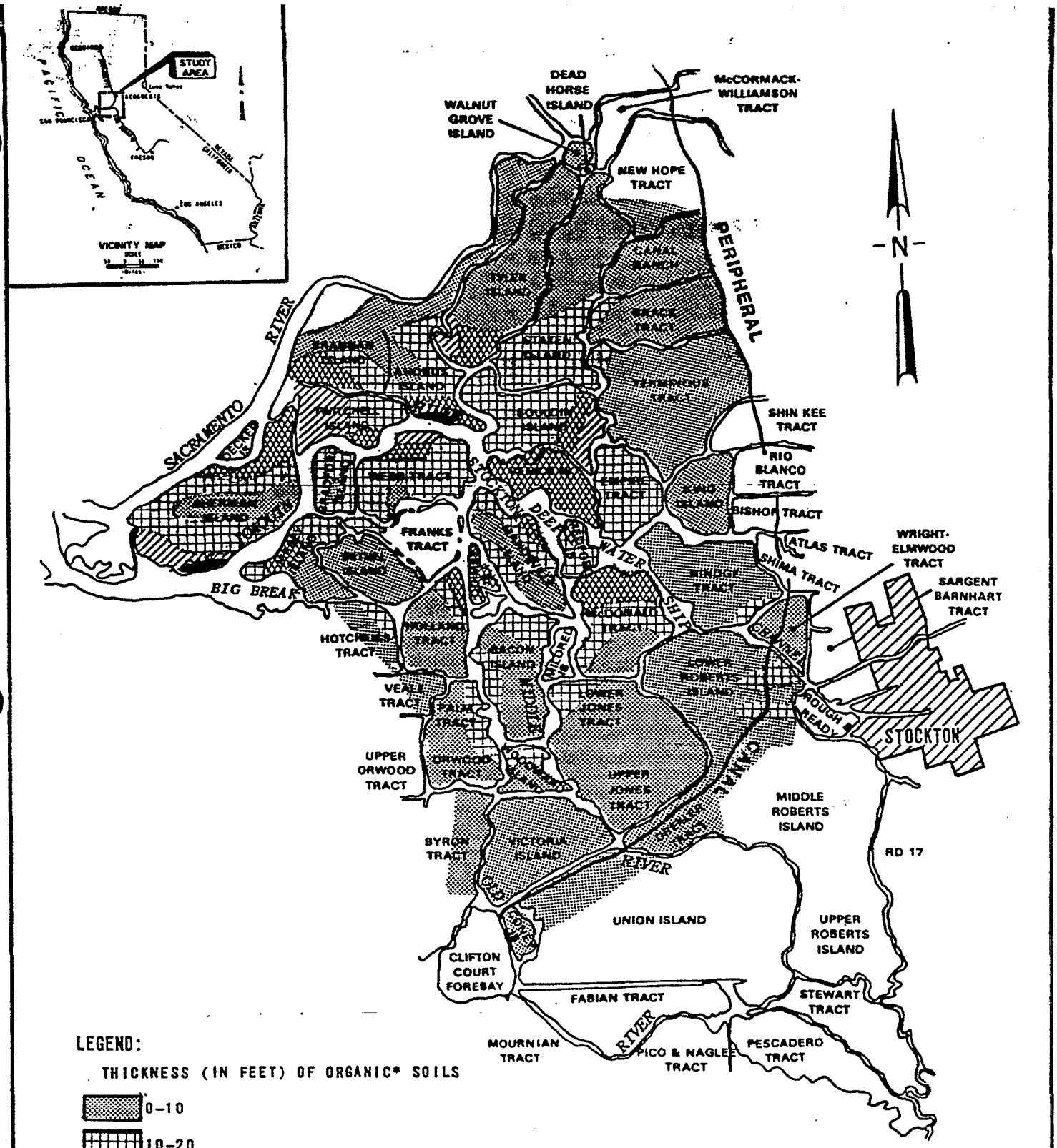

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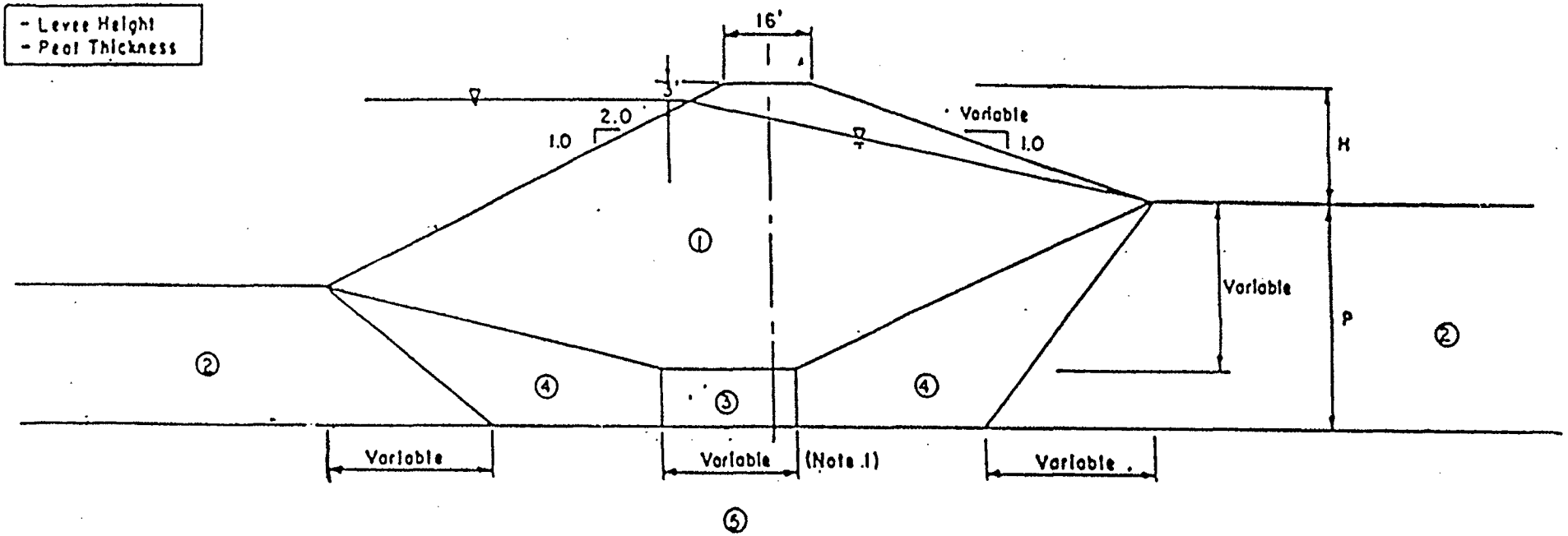
LEGEND

- Levee Height
- Peat Thickness



Zone	Material	Moist Wt (PCF)	Sat Wt (PCF)	Strength c (PCF)	Strength ϕ (Deg)
1	Levee Fill - Clay, Sand Peat, Silt	115	120	0	33
2	Foundation - Unconsolidated Peat & Clayey Peat	77	77	100	18
3	Foundation - Consolidated Peats & Clayey Peats	85	85	200	27
4	Foundation - Partially Consolidated Peats & Clayey Peats	85	85	150	25
5	Foudation - Clayey Sand, Firm Sand & Silty Sand	127	135	0	35

NOTES:

1. Dimensions noted as variable, change as a function of levee height and peat depth.
2. References a & d.
3. No distinction is made between peat, organic silt, organic clay, and mineral soil containing greater than 25% organics.

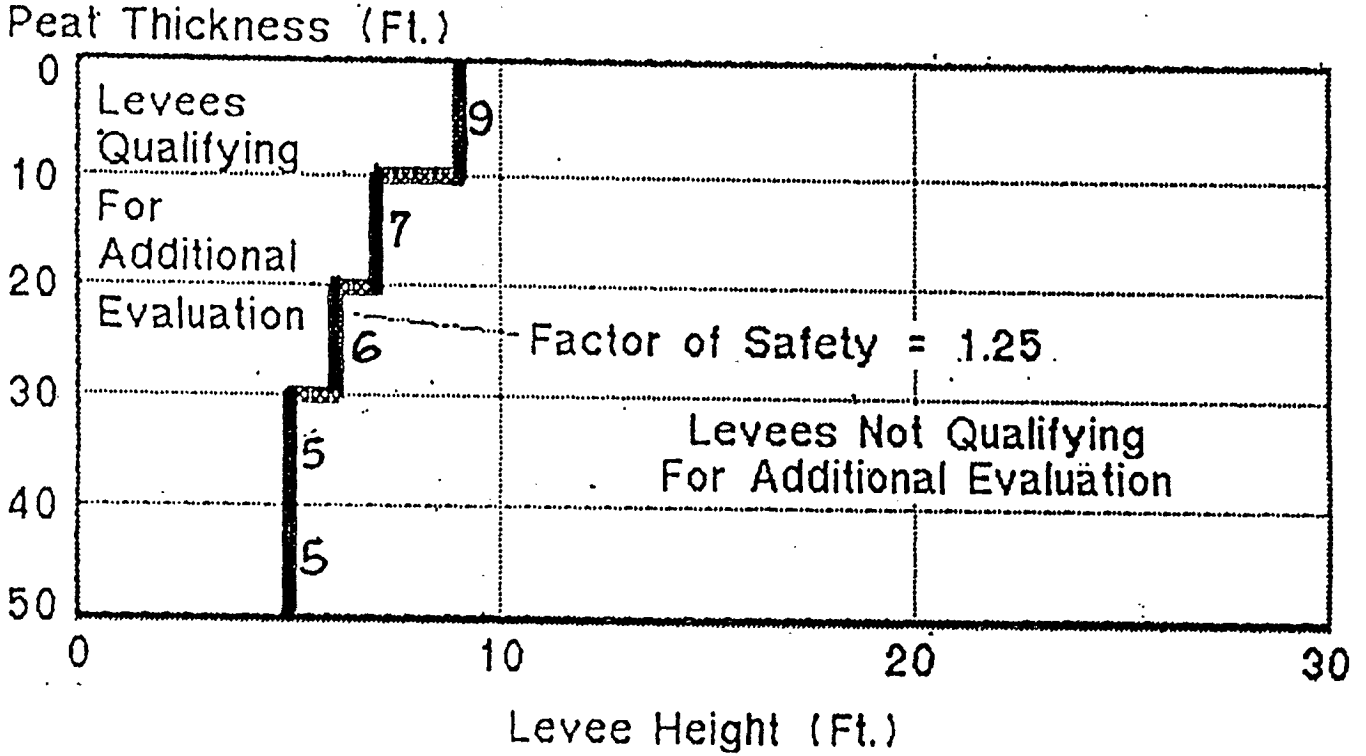
Minimum Levee Geometry
Sacramento - San Joaquin Delta

GENERALIZED LEVEE SECTION & DESIGN PARAMETERS

D-1

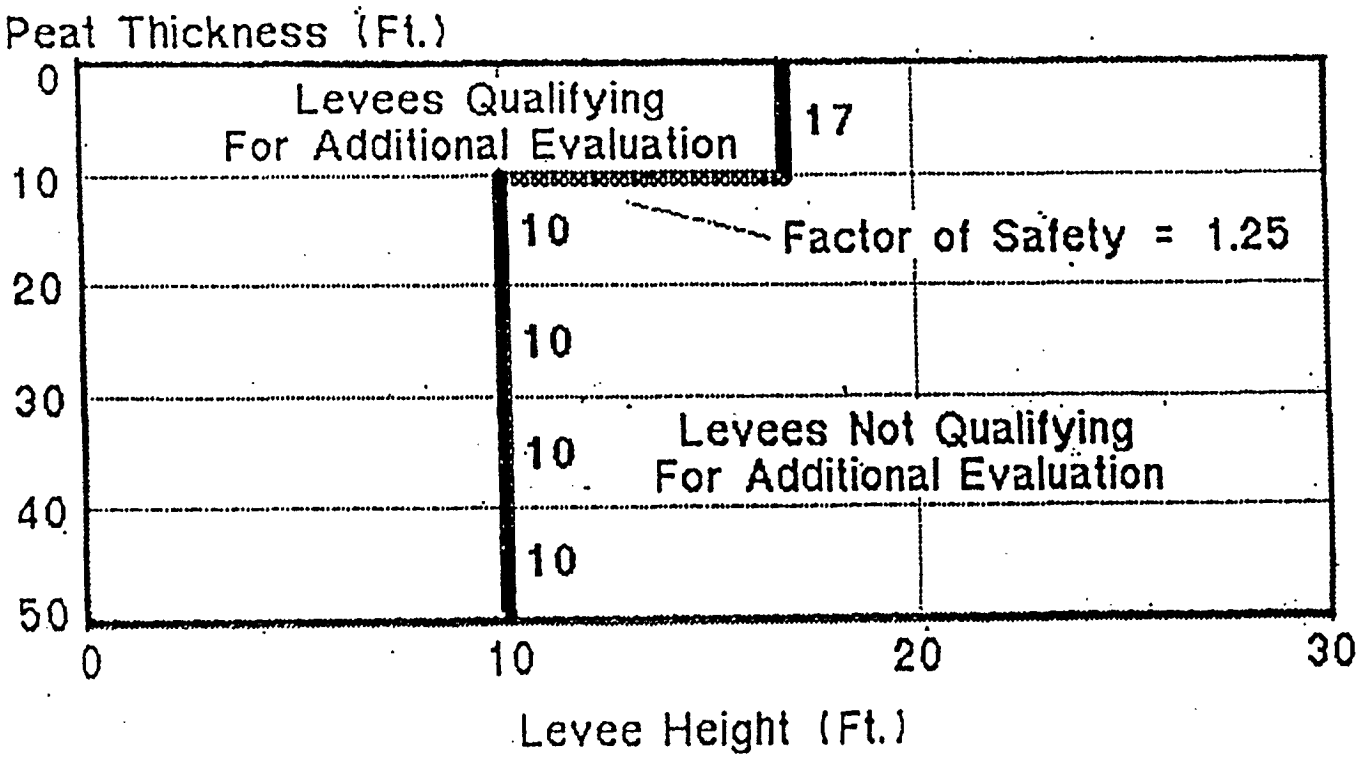
Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 2(H) LANDSIDE SLOPE



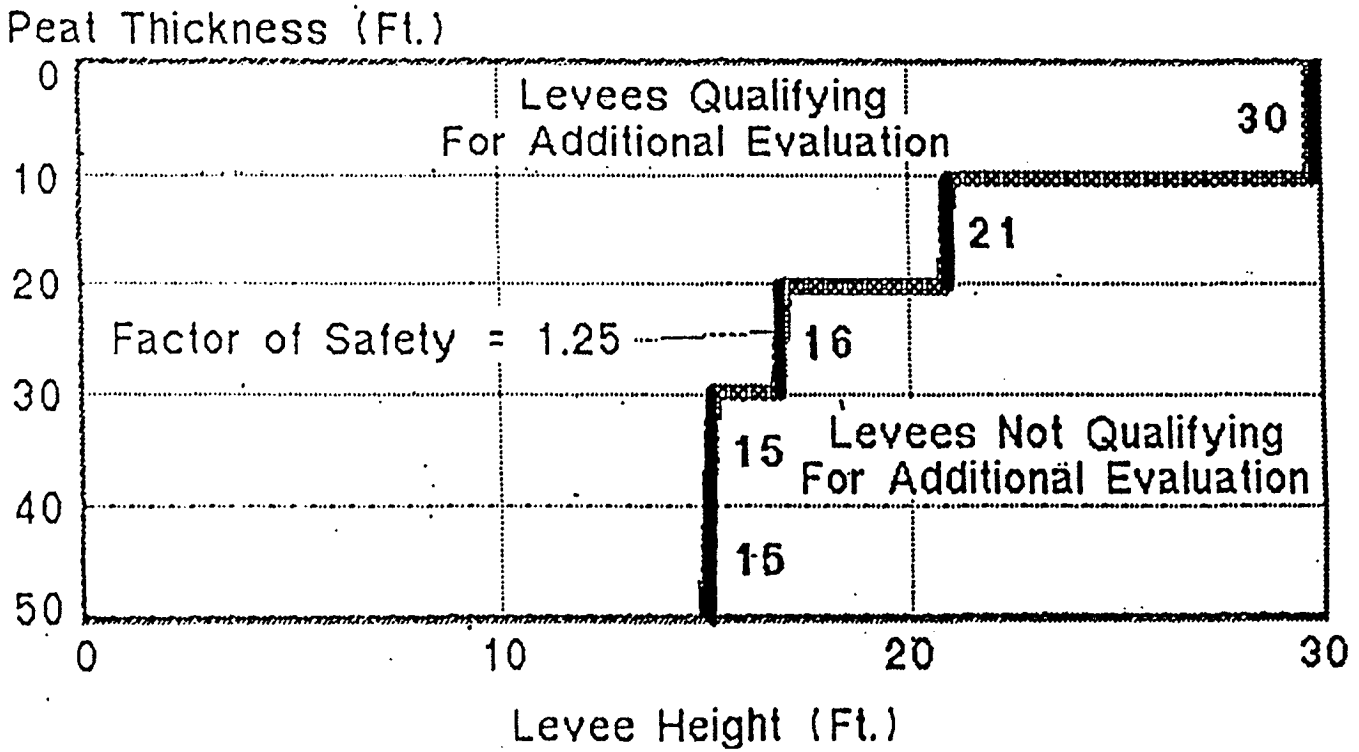
Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 3(H) LANDSIDE SLOPE



Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 4(H) LANDSIDE SLOPE



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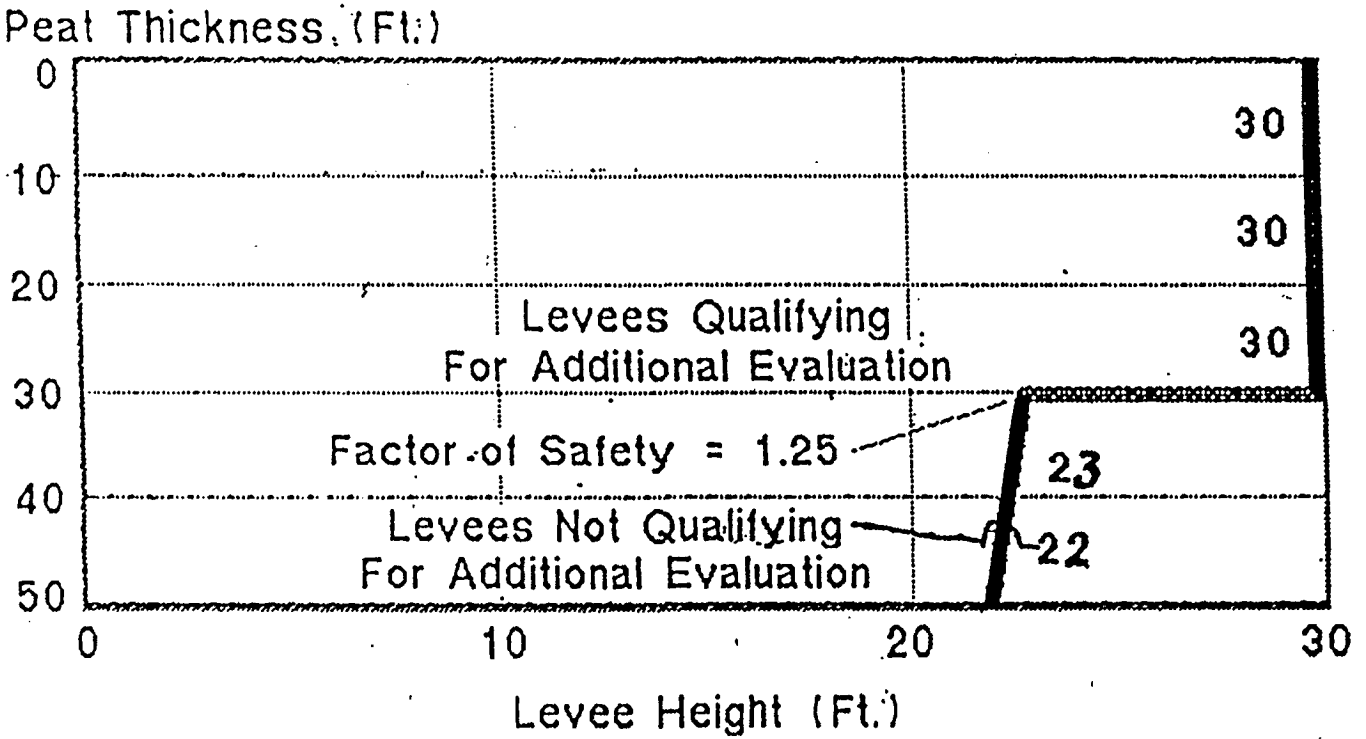
Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 5(H) LANDSLIDE SLOPE



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US ARMY CORPS OF ENGINEERS

DISASTER ASSISTANCE OVERVIEW

The US Army Corps of Engineers is a major Army command with a broad set of missions and capabilities. One of its missions is to provide assistance, within its authorities, when natural disasters or other emergencies occur.

Emergency preparedness and response is primarily a state and local responsibility. However, in instances when the nature of the disaster exceeds the capabilities of state and local interests, the Corps of Engineers may provide help to save human life, prevent immediate human suffering, or mitigate property damage.

The authority for the Corps of Engineers to provide such assistance is Public Law (PL) 84-99. Under this law, the Corps of Engineers is authorized to provide assistance under the following six programs:

1. Disaster Preparedness
2. Advance Measures
3. Emergency Operations
4. Rehabilitation and Inspection of Flood Control Works
5. Emergency Water
6. Hazard Mitigation

Each program is described in greater detail in the subsequent paragraphs.

1. Disaster Preparedness. State and local governments are responsible for natural disaster emergency preparedness, including training and stockpiling of flood fight supplies. The role of the US Army Corps of Engineers is to supplement maximum efforts of the state and local authorities during a natural disaster emergency. The Corps of Engineers provides the following assistance to the state and local communities:

a. Provides personnel to assist communities with public information programs for awareness and knowledge of natural disaster hazards.

b. When requested by state and local officials, the Corps will participate in natural disaster emergency seminars or exercises.

c. Provide technical assistance for development of emergency plans at the state and local level.

d. Inspection of flood control works constructed or repaired by the Corps of Engineers, and advisement to local sponsors of needed maintenance.

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e. Upon request, inspection of non-federal flood control works. This is covered more thoroughly under Rehabilitation of Flood Control Works.

2. Advance Measures. Advance measures consist of actvities performed prior to a flood event, including flood fighting actions, to protect against loss of life and damages to urban and/or public facilities. The threat must be of a nature that if no action is not immediately taken, damages will be incurred. The following criteria must be met for Corps assistance:

a. An imminent threat of unusual flooding must exist to justify assistance. The threat must be established by either the National Weather Service (NWS) forecast or by Corps determination of unusual flooding from adverse conditions.

b. Assistance will be in support of state and local on going or planned efforts. All activities will be coordinated with the State Office of Emergency Operations or equivalent. Local and state interests must commit available resources.

c. A written request is required from the state governor or designated representative.

d. Requested assistance must be technically feasible and have a economically justifiable cost benefit ratio.

e. Assistance will be temporary in nature, designed to effectively deal with the specific threat, and capable of construction in time to prevent projected damages.

f. These projects must have a Public Sponsor.

g. Assistance is terminated when the imminent flood threat ends.

h. Assistance may be in the form of Technical or Direct assistance.

i. Technical assistance consists of technical review, advice, and/or recommendations to state and local agencies before, during and/or after a flood event. The following are examples of technical assistance support:

- Provide personnel to inspect existing flood control works to identify potential problems and solutions, to evaluate conditions to determine additional flood control protection requirements, and to recommend the most expedient construction methods.

- Provide hydraulic, hydrologic, and/or geotechnical analysis.

- Provide information, readily available at Corps districts, to local entities for use in the preparation of local

evacuation and/or contingency flood plans.

j. Direct assistance provided by the Corps to supplement state and local resources may include:

- Flood fight materials such as sandbags, plastic sheeting, lumber, stone, pumps etc.

- Corps equipment if available

- Emergency contracting

k. The types of emergency work the Corps can provide are:

- Emergency work on Federal and Non-Federal Flood Control Works by strengthening or temporary raising to prevent structural failure or overtopping.

- Construction of temporary flood control levees to protect life and improved property.

- Removal of channel obstructions to allow the passing of predicted flood flows. Obstructions may be snags/logs or debris jams, or sand and gravel bars restricting hydraulic capacity.

- Relieve the threat of dam failures by dewatering, controlled breaching, or strengthing.

3. Emergency Operations. The Corps of Engineers may provide emergency assistance for flood and post flood response to save lives and protect improved property, such as public facilities/services and residential/commercial developments. This assistance will supplement state and local efforts. State and local entities must commit all available resources, i.e., manpower, supplies, equipment, funds, etc. Assistance to individual homeowners, businesses (to include agricultural property) is not permitted.

a. Corps assistance during flood fight operations will be of a temporary nature to meet the immediate threat and is not intended to provide permanent solutions to flood problems.

b. Emergency assistance must be requested by the state governor or his/her designated representative for flood and post flood response.

c. The Corps flood fight assistance may be in the form of technical or direct assistance.

- Technical Assistance for any disaster consists of providing review and recommendations in support of state and local efforts. Examples of technical assistance are:

(1) Providing experienced personnel at the

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disaster site to give guidance on flood fight techniques and emergency construction methods.

(2) Providing personnel to inspect existing flood protection projects and/or structurally threatened dams to identify problem areas and recommended corrective measures.

(3) Providng hydraulic or hydrologic analysis, geotechnical evaluations, topography and stream data, maps, and historic flood or storm information.

- Direct Assistance may include but is not limited to the following:

(1) Purchase of flood fight materials to support on-going state and local efforts. These materials include sandbags, sand, plastic sheeting, lumber, etc. Government supplies may be furnished only if local resources are exhausted or will be exhausted. Unused materials will be returned, replaced in kind, or reimbursement made to the Corps of Engineers.

(2) Assist in search and rescue operations. The Corps may use its resources in such operations.

(3) Corps may direct flood fight operations upon request of an appropriate state or local official. However, legal responsibility remains with the requesting official.

(4) Emergency contracting will be available to hire equipment and operators. Emergency work includes construction of temporary levees, the emergency repair, strengthening, or temporary raising of levees or other flood control works, or removal of stream obstructions.

d. Flood response assistance will end when the flood waters recede to bankfull conditions.

e. The authority for the Corps of Engineers to perform post flood response was enacted by the US Congress under Section 917 of the Water Resources Act of 1986. The intent of this authority is to allow Corps assistance prior to a Presidential Declaration made under authority of the Stafford Act. Corps assistance will be limited to major floods/coastal storms resulting in life threatening situations. Response is limited to lifesaving actions and protection of public facilities/services and residential/commercial developments. Assistance to individual homeowners and businesses (to include agricultural property) is not permitted.

- A written request from the governor to the appropriate district commander will be provided concurrently with or immediately after the governor's request to FEMA for a Preliminary Damage Assessment (PDA).

- This request must indicate that recovery work is

beyond the capability of the state, identify specific damage locations, and detail specific requirements for Corps of Engineers assistance.

- Corps assistance is limited to a maximum of 10 days from the receipt date of the governor's request for assistance.

- No work, including contract work, shall be performed after the 10 day period expires. Post response assistance may be technical or direct assistance. Direct assistance activities include:

(1) Clearance of debris necessary to reopen critical transportation routes.

(2) Restoration of critical transportation routes or public ervices or facilities.

(3) Other assistance required to prevent loss of life or public property as determined by the division or district commander.

4. Rehabilitation and Inspection Program (RIP). The RIP is the Corps of Engineers program that implements the provisions of Public Law 84-99 regarding inspection and rehabilitation of Non-Federal flood control works and the rehabilitation of Federal flood control works. Rehabilitation assistance is limited to eligible Non-Federal and Federally authorized flood control projects. The Non-Federal Flood Control Works Rehabilitation Program is described on pages 7 thru 10 and Exhibit A and B. Structures that are not eligible for assistance are:

a. Structures built for channel alignment, navigation, recreation, fish and wildlife, land reclamation, drainage, or to protect against land erosion are not flood control works.

b. Bank protection works, river control structures, or other non-flood control projects constructed by the Corps.

c. Structures damaged by non-flood disasters such as earthquakes or volvanic eruptions are not authorized assistance. If a potential flood threat exists due to damage caused by a non-flood disaster, Corps of Engineers Headquarters may grant exceptions on a case by case basis to allow rehabilitation.

d. Those flood control works constructed, operated and maintained by the Corps or other Federal agencies are not eligible for inclusion into the RIP and not eligible for rehabilitation assistance. Those flood control works constructed, modified, or repaired with financial assistance from other Federal agencies (e.g., Bureau of Reclamation, Natural Resources Conservation Service) are not eligible for assistance, unless exceptions are granted by Corps of Engineers Headquarters.

e. The project Public Sponsor must furnish items of

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cooperation and assurance prior to any construction work:

(1) Provide without cost to the United States all lands, easements, barrow lands, and rights-of-way necessary.

(2) Hold and save the United States free from damages due to the work, exclusive of damages due to negligence of the United States or its contractor.

(3) Maintain and operate, in a manner satisfactory to the Chief of Engineers, the entire project after completion.

5. Emergency Water Assistance. The Corps may provide potable water to any community confronted with water supply problems associated with a contaminated water source or drought conditions. The supply problems must present a substantial threat to the public health and welfare of the inhabitants in the area. The intent of the assistance is to meet minimum public health, safety, and welfare requirements. This assistance will supplement state and local relief efforts to supply water for public health and welfare.

a. Written request required from the state governor or authorized representative.

b. Contamination, whether deliberate, accidental, or natural will be be established by one or more of the following:

(1) Maximum established contaminant levels pursuant to the Safe Drinking Water Act are exceeded.

(2) Water supply identified as source of illness by state or Federal public health official.

(3) Emergency situation has either resulted in contaminants entering the source or has made equipment inoperable to remove the contaminants.

c. Assistance provided for transportation of bulk water by certified vehicle, small diameter pipeline, purchase of bottled water, or installation of temporary filtration units. Must be cost effective and meet the need. Also, construction of wells by competitive bid contract.

d. Assistance provided for 30 days. Extensions granted with adequate justification and explanation.

e. A drought distressed area is one that the Assistant Secretary of the Army determines to have an inadequate supply which is causing, or is likely to cause, substantial threat to public health and welfare of the area including threat of damage or loss of property.

6. Hazard Mitigation. The Corps of Engineers supports and is a member of the FEMA Hazard Mitigation Team.

PUBLIC LAW 84-99 AS AMENDED
Non-Federal Flood Control Works Rehabilitation Program

A. General Policy

The Corps of Engineers has authority, under PL 84-99, to repair flood control projects which are damaged by flood. Flood control projects constructed by non-Federal interests may be eligible for this disaster recovery assistance provided that certain criteria for eligibility and local cooperation are met. For example, a project constructed by non-Federal interests must meet established Corps quidelines to establish its structural integrity for flood control purposes. The policy is consistent with policy and procedures established by other Federal agencies for disaster assistance. The policy will help insure that the intent of Executive Order 11988 is met.

B. Policy Background

In July 1986, the Corps of Engineers revised and standardized the PL84-99 levee rehabilitation program for structures not originally constructed by a Federal agency. The program revisions were intended to provide uniformity throughout the Corps in establishing requirements for state and local participation associated with rehabilitation assistance. The revisions culminated in focusing on development of uniform eligibility quidelines and requirements for public sponsorship and local cooperation, to include cost sharing. The revisions will provide for greater participation by concerned state and local agencies in the Corps non-Federal flood control project rehabilitation program. Also, project sponsors are given the same eligibility requirements nationwide, for promoting local attention on disaster preparedness and promoting improved levee design and maintenance, and encourage sound floodplain management practices.

C. Policy Coordination Between Corps and NCRS

In 1986, the Corps and Soil Conservation Service (NCRS) signed a Memorandum of Agreement which outlined how the two agencies would delineate responsibility for repair of levees. The agencies agreed in general principle that the delineation would be based upon the area of geoghraphical contributing drainage. The Corps would be responsible for repairing levees with drainage areas of 400 square miles or greater with the NCRS responsible drainage areas less than 400 square miles. Corps policy for the repair of levees in the Corps geographic areas requires that levee sponsors be active participants in the Corps PL84-99 non-Federal levee rehabilitation program at the time of the disaster event to be considered eligible for rehabilitation assistance. Sponsors or private owners that have not applied for

the Corps program and are in the NCRS's area of responsibility should seek assistance under NCRS's Emergency Watershed Program.

D. Corps PL84-99 Non-Federal FCW Rehabilitation Program

1. To become eligible for assistance, several steps must be taken. One very important step the levee owner must take is to acquire public sponsorship for the flood control structure. The public sponsor will request the Initial Levee Eligibility Inspection on behalf of the levee owner. The sponsor will sign the Project Cooperation Agreement with the Federal Government in the event rehabilitation work will be authorized on the levee. A public sponsor must be a financially, viable identity capable of fulfilling operations and maintenance requirements and ensuring proper stewardship of the Federal investment. The sponsor must be one of the following:

* state chartered organization such as a levee board, reclamation board, flood control district, etc.
* a legal subdivision of a state or a county government
* a local unit of government
* a qualified Indian tribe or tribal organization

2. Another step in the eligibility process is the eligibility inspection. This inspection will be conducted by the Corps to assess the integrity and reliability of your flood control works. The eligibility inspection will consist of:

* structural and geotechnical analysis
* hydrologic and hydraulic evaluation
* operation and maintenance determinations

The eligibility inspection will be conducted using a rating quide which provides the inspector with a consistent and accurate system of inspection. An inspection checklist, based upon the quidelines, will be filled out at the conclusion of the field inspection. A copy of this checklist will be provided to the sponsor on site for his records and a copy retained in the Corps files. At the conclusion of the eligibility determination process, the sponsor and owner will receive written notification of the overall condition of the levee. The levee will be rated as one of the following:

* Acceptable - no work required
* Minimally Acceptable - deficient conditions exist which should be improved
* Unacceptable - the levee is ineligible for rehabilitation assistance under PL84-99 unless corrective action is taken and the levee is reinspected before any request for assistance is accepted.

If an unacceptable rating is given, a recommendation for corrective action will be made by the Corps of Engineers. If the levee sponsor does not comply with the recommendation and the levee **is not** upgraded to at least the Minimally Acceptable level, the Corps **will not** perform repair work in the event of damage resulting from a flood. The sponsor should complete the recommended upgrade work as soon as possible. If the levee is upgraded to at least the Minimum Acceptable level, the sponsor **must** notify the Corps that the corrective work has been completed. The levee will be reinspected and reinstated in the program as an active levee. An Unacceptable rated levee is carried as an inactive levee until corrective work is accomplished.

The Corps will conduct Continuing Eligibility Inspections utilizing the Maintenance Compliance Guide for all flood control works that are in an "active" eligibility status. These subsequent inspections will be for the purpose of detecting significant changes to the levee from the Initial Inspection which impact the integrity of the levee. A rating in accordance with the rating guidelines will be given for each inspection and will be performed at least once every two years. If the levee receives an unacceptable rating on these inspection, the levee will be put in an "inactive" status until the corrective work is accomplished and the sponsor requests the Corps to perform a re inspection.

E. Criteria for Corps Assistance

The following criteria must be met for the Corps to repair Federal and non-Federal flood control works.

* The Corps will repair federal levees and flood control works at 100% cost to the federal government. A federal levee or federal flood control works is authorized, constructed by the Corps, and operated and maintained by a local sponsor.
* Requests for Corps assistance in repairing non federal flood control works must:
    * Be in an "active" status under the PL84-99 FCW rehabilitation program.
    * Be from the public sponsor.
    * Be economically justified (have a favorable cost benefit ratio of at least 1:1).
    * Be cost shared 80% federal and 20% public sponsor.
    * Provide required level of flood protection.
    * Adhere to environmental laws, policies and regulations.
    * Meet the rehabilitation engineering and maintenance guidelines prior to the flood event.
    * Restore flood control Works (FCW) to original pre-flood conditions.

Attached Exhibit A contains the Eligibility Rating Guidelines, Policy Summary, and the Project Cooperation Agreement. The rating quidelines **are not** intended as an absolute standard, nor

are they intended to establish design standards for non-Federal flood control works. The guidelines are used to establish uniform procedures in assigning rating codes to the flood control works.

F. Sacramento-San Joaquin Delta Specific Guidelines

1. In 1987, the Corps implemented additional eligibility guidelines specifically for the legal delta, as defined by the California State Water Code Section 12200, dated 1959. The Delta-exclusive quidelines supplement the National Guidelines described in paragraphs D and E.

2. The minimum quidelines that must be met for the flood control works to be eligible for PL84-99 rehabilitation consideration are as follows:

* 1.5 feet of levee freeboard above the 100 year flood stage for all islands/tracts. These are the same 100 year flood stages used for the Flood Hazard Mitigation Plan, Sacramento-San Joaquin Delta, Disaster Declaration FEMA-758-DR-CA, 1986.
* The levee will have a 16 foot crown width with an all weather patrol road.
* A levee toe drain will be located 30 feet landward from the land side levee toe.
* The minimum water side slope of the levee will be 1V:2H.
* The minimum land side slope of the levee will vary with the levee height and the depth of peat. The levee stability charts in attached Exhibit B were computed using an idealized levee section with 5 zones of materials and using a safety factor of 1.25. Public sponsors whose levees do not fit into these quidelines may submit data/information prepared by a registered engineer (geotechnical, soils, civil) that demonstrates their levees meet or exceed a 1.25 factor of safety. A delta peat thickness map is included in Exhibit B.

3. Public sponsors may request an evaluation of their non-Federal flood control works system by providing the following information to U.S. Army Corps of Engineers, ATTN: Construction-Operations Division, Readiness Branch, 1325 J Street, Sacramento, CA 95814-2922. The telephone number is (916) 557-6911 or 557-6913.

Rating codes:

A- Acceptable Performance Level
M- Minimally Acceptable Performance Level
U- Unacceptable Performance Level

ITEM	RATING GUIDE	
1.	**Level of Protection**	A- The designed section is for an exceedance frequency greater than 10% chance (10 yr.) with minimum freeboard of 2 feet.
		M- The designed section is for an exceedance frequency between 20% to 10% chance (5-10 yr) with minimum freeboard of 1 foot.
		U- The designed section is less than the minimum required for an M rating.
2.	**Erosion Control**	A- Erosion protection in active areas is capable of handling the designed flow velocity for the level of protection for the entire FCW.
		M- Erosion protection is capable of handling the designed flow velocity for the level of protection for 75% or more of the FCW.
		U- Erosion protection measures protects less than 75% of the FCW; or if erosion protection was not provided and there is evidence indicating a need for erosion protection.
3.	**Embankment**	A- Fill material for embankment is suitable to prevent slides and seepage for the existing side slopes. Fill material is uniform and adequately compacted through the entire FCW.
		M- Material is adequate and suitable to prevent major slides and capable of handling localized seepage for the existing side slopes. Fill material is uniform and adequately compacted in 75% or more of the FCW.
		U- Material is unsuitable and likely to cause numerous slides and allow excessive uncontrolled seepage. Fill material is not uniform, or there is no compaction and evidence indicates a need for compaction.
4.	**Foundation**	A- Foundation materials will not cause piping, sand boils, seepage, or settlements which reduce the level of protection.
		M- Foundation materials may show signs of excessive seepage, minor sand boils, and localized settlements.
		U- Foundation materials are unsuitable and likely to cause excessive uncontrolled seepage, sand boils, and piping.

Figure E-2. Engineering Guide

5.	**Structures**	A- Structures are capable of performing their design functions and show no signs of failure.
		M- Structures are performing their design functions but show signs of overtopping and bypassing flows.
		U- Structures are not performing their design functions or show signs of structural failure.

Figure E-2. Engineering Guide (Cont'd)

TABLE E-2
Cross Section Template Data

Levee Material	Maximum Riverward Side-Slope	Maximum Landward Side-Slope	Maximum Height	Top Width
Clay	1V on 2 1/2H	1V on 2 1/2H	12 Feet	10 Ft
Sand	1V on 3H	1V on 4H	15 Feet	10 Ft

Table E-2 used as a quide for the evaluation of slope stability.

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E-5. Maintenance Compliance Guide. This guide (Figure E-3) is used to assign a rating for maintenance compliance during the Initial Eligibility Inspection and the Continuing Eligibility Inspection. The evaluation should reflect the level of maintenance required to insure the intended degree of flood protection and actions required by the [redacted]/sponsor for a FCW to remain eligible for the rehabilitation program under PL 84-99.

Rating codes:

A- Acceptable Performance Level
M- Minimally Acceptable Performance Level
U- Unacceptable Performance Level

ITEM	RATING GUIDE	
1.	**Depressions**	A- Minimal depressions or potholes; proper drainage.
		M- Some depressions that will not pond water.
		U- Depressions 6" vertical or greater which endangers the integrity of the levee.
2.	**Erosion**	A- No erosion observed.
		M- LEVEES: Erosion of levee crown or slopes that will not interrupt inspection or maintenance access. OTHER: Erosion gullies less than 6 inches deep or deviation of 1 foot from designed grade or section.
		U- LEVEE: Erosion of levee crown or slopes that has interrupted inspection or maintenance access. OTHER: Erosion gullies greater than 6 inches or deviation of 1 foot or more from designed grade or section.
3.	**Slope Stability**	A- No slides present, or erosion of slopes more than 4" deep.
		M- Minor superficial sliding that with deferred repair does not pose an immediate threat to FCW integrity. No displacement or bulges.
		U- Evidence of deep seated sliding (2 ft. vertical or greater) requiring repairs to re-establish FCW integrity.
4.	**Cracking**	A- No cracks in transverse or longitudinal direction observed in the FCW.
		M- Longitudinal cracks are no longer than the levee height. No displacement and bulging. No transverse cracks observed.
		U- Longitudinal cracks are greater than levee height with some bulging observed. Transverse cracks are evident.

Figure E-3. Maintenance Compliance Guide

5.	**Animal Burrows**	A-	Continuous animal burrow control program that eliminates any active burrowing in a short period of time.
		M-	Animal burrows present that will not result in seepage or slope stability problems.
		U-	Animal burrows present that would result in possible seepage or slope stability problems.
6.	**Unwanted Levee Growth**	A-	No large brush or trees exist in the FCW. Grass cover well maintained. CHANNELS: Channel capacity for designed flows is not affected.
		M-	Minimal tree (2" diameter or smaller) and brush cover present that will not threaten FCW integrity. (NOTE: Trees that have been cut and removed from levees should have their roots excavated and the cavity filled and compacted with impervious material). CHANNELS: Channel capacity for designed flows is not adversely affected.
		U-	Tree, weed and brush cover exists in the FCW requiring removal to re-establish or ascertain FCW integrity. (NOTE: If significant growth on levees exists, prohibiting rating of other levee inspection items, then the inspection should be ended until this item is corrected.) CHANNEL: Channel obstructions have impaired the floodway capacity and hydraulic effectiveness.
7.	**Encroachments**	A-	No trash, debris, excavations, structures, or other obstructions present.
		M-	Trash, debris, excavations, structures, or other obstructions present or inappropriate activities occurring that will not inhibit operations and maintenance performance.
		U-	Trash, debris, excavations, structures or other obstructions present or inappropriate activities that would inhibit operations and maintenance performance.
8.	**Riprap/Revetment**	A-	Existing protection works which is properly maintained and undamaged.
		M-	No scouring activity that could undercut banks, erode embankments, or restrict desired channel flow.
		U-	Meandering and/or scour activity that is undercutting banks, eroding embankments (such as levees), or impairs channel flows by causing turbulence, meandering or shoaling.

Figure E-3. Maintenance Compliance Guide (Cont'd)

9.	**Stability of Concrete Structures**	A- Tilting, sliding or settling of structures, that has been secured which preserves the integrity or performance. M- Uncorrected sliding or settlement of structures of a magnitude that doesn't affect performance. U- Tilting or settlement of structures that has resulted with a threat to the structure's integrity and performance.
10.	Concrete Surfaces	A- Negligible spalling or scaling. No cracks present that are not controlled by reinforcing steel or that cause integrity deterioration or result in inadequate structure performance. M- Spalling, scaling and cracking present but immediate integrity or performance of structure not threatened. U- Surface deterioration or deep, controlled cracks present that result in an unreliable structure.
11.	**Structural Foundations**	A- No scouring or undermining near the structures. M- Scouring near the footing of the structure but not close enough to impact structure stability during the next flood event. U- Scouring or undermining at the foundation which has impacted structure integrity.
12.	**Culverts**	A- [a] No breaks, holes, cracks in the culvert that would result in any significant water leakage. No surface distress that could result in permanent damage. [b] Negligible debris or silt blocking culvert section. None or minimal debris or sediment present which has negligible effect on operations of the culvert. M- [a] Culvert integrity not threatened by spalls, scales or surface rusting. Cracks are present but resulting leakage is not impacting the structure. [b] Debris or sediment present, which is proposed to be removed prior to the next flood event, that minimally affects the operations of the culvert. U- [a] Culvert has deterioration such as surface distress and/or has significant leakage in quantity or degree to threaten integrity. [b] Accumulated debris or settlement which has not been annually removed and severely affects the operations of the culvert.

Figure E-3. Maintenance Compliance Guide (Cont'd)

13.	**Gates**	A- Gates open easily and close to a tight seal. Materials do not have permanent corrosion damage and appear to have historically been maintained adequately.
		M- Gates operate but leak when closed, however, leakage quantity is not a threat to performance. All appurtenances of the facility are in satisfactory condition.
		U- Gates leak significantly when closed or don't operate. Gates and appurtenances have damages which threaten integrity and/or appear not to have been maintained adequately.
14.	**– Closure Structures**	A- Closure structure in good repair. Placing equipment readily available at all times.
		U- Closure structure in poor condition. Parts missing. Placing equipment may not be available within normal warning time.
15.	**Pumps and Motors**	A- All pumps and motors are operational. Preventive maintenance is occurring and system is periodically subject to performance testing.
		M- All pumps are operational and minor discrepancies are such that pumps could be expected to perform through the next projected period of usage.
		U- Pumps are not operational, or noted discrepancies have not been corrected.
16.	**Power**	A- Adequate, reliable, and enough capacity to meet demands.
		U- Power source not considered reliable to sustain operations during flood condition.
17.	**Pump Control System**	A- Operational and maintained free of damage, corrosion or other debris.
		M- Operational with minor discrepancies.
		U- Not operational, or uncorrected noted discrepancies.
18.	**Metallic Items**	A- All metal parts in a plant/building protected from permanent damage from corrosion. Trash racks free from damage/debris and are capable of being cleared, if required, during operation. Gates operable.
		M- Corrosion on metal parts appears maintainable. Trash racks free from damage and minimum debris present, and capable of being cleared before next flood event or during operation. Gates operable.
		U- Metal parts need replacement. Trash racks damaged, have accumulated debris that have not been cleared annually or cannot be cleared during operation.

Figure E-3. Maintenance Compliance Guide (Cont'd)

19.	**Sumps**	A- Clear of debris and obstructions, and mechanisms are in place to maintain this condition during operation.
		M- Clear of large debris and minor obstructions present and mechanisms are in place to deter further accumulation during operation.
		U- Large debris or major obstructions present in sump or no mechanism exists to prevent debris accumulation during operation.

Figure E-3. Maintenance Compliance Guide (Cont'd)

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION
SECTION I				*FOR USE DURING INITIAL ELIGIBILITY INSPECTION ONLY*
1. Pump Station Size				Pump station has adequate capacity (considering pumping capacity, ponding areas, etc.) to handle expected inflow volumes. (A or U.)
SECTION II				*FOR USE DURING ALL PUMP STATION INSPECTIONS*
2. O&M Manual				O&M Manual is present and adequately covers all pertinent areas. (A or U.)
3. Operating Log				Pump Station Operating Log is present and being used. (A or U.)
4. Annual Inspection				Annual inspection is being performed by the local sponsor. (A or U.)
5. Plant Building				A Plant building is in good structural condition. No apparent major cracks in concrete, no subsidence, roof is not leaking, etc. Intake louvers clean, clear of debris. Exhaust fans operational and maintained. Safe working environment. M Spalling and cracking are present, or minimal subsidence is evident, or roof leaks, or other conditions are present that need repair but do not threaten the structural integrity or stability of the building. U Any condition that does not meet at least Minimum Acceptable standards.
6. Pumps				A All pumps are operational. Preventive maintenance and lubrication are being performed. System is periodically subjected to performance testing. No evidence of unusual sounds, cavitation, or vibration. M All pumps are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next expected period of usage. U One or more primary pumps are not operational, or noted discrepancies have not been corrected.
7. Motors, Engines, and Gear Reducers				A All items are operational. Preventive maintenance and lubrication being performed. System is periodically subjected to performance testing. Instrumentation, alarms, and auto shutdowns operational. M All systems are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next expected period of usage. U One or more primary motors are not operational, or noted discrepancies have not been corrected.
8. Trash Rakes				A Drive chain, bearings, gear reducers, and other components are in good operating condition and properly maintained. M Drive chain, bearings, gear reducers, and other components are capable of performing as designed through the next flood event. U Proper operation would be inhibited during the next flood event.
9. Other Metallic Items				A All metal parts in plant/building are protected from permanent damage by corrosion. Equipment anchors show no rust or deterioration. M Corrosion on metallic parts (except equipment anchors) appears maintainable. U Any condition that does not meet at least Minimum Acceptable standards.
10 Insulation Megger Testing				A Results of megger test show that insulation meets manufacturer's or industry standard. Test not more than 24 months old. M Results of megger test show that insulation resistance is lower than manufacturer's or industry standard, but can be corrected with proper application of heat. U Insulation resistance is low enough to cause the equipment to not be able to meet its design standard of operation.
11 Backup Power				A Adequate, reliable, and enough capacity to meet demands. Required backup generators are on hand and deemed reliable. Backup units are properly sized, operational, periodically exercised, and maintained in accordance with operating manual. U Power source not considered reliable to sustain operations during flood condition.

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION
12 Pump Control System				A Operational and maintained free of damage, corrosion, or other debris. M Operational with minor discrepancies. U Not operational, or uncorrected discrepancies noted from previous inspections.
13 Sumps				A Clear of debris and obstructions. Mechanisms are in place to maintain this condition during operations. M Clear of large debris, minor obstructions present. Mechanisms are in place to deter any further accumulation during operation. Sump will function as intended. U Large debris or major obstructions present, or no mechanism exists to prevent debris acoumulation during operation.
14 Intake/Discharge Gates.				Functional. Electric operators maintained. (A or U.)
15 Cranes_				Operational. Inspected and load tested in accordance with OSHA requirements. (A or U.)
16 Telephone Communications				Telephone communication is available in the pump station. Alternatively, two-way radio, cellular telephone, or similar device is available, or, access to a telephone is within a reasonable driving distance. (A or U.)
17 Safety				No exhaust leaks in building. Fuel storage/distribution meets state/local requirement. Fire extinguishers on hand, of sufficient quantity, and properly charged. Safety hardware installed. Required safety items (e.g., aural protectors) used. (A or U.)
18 Remarks.				Continued on separate sheet: Yes ____ No ____

GENERAL INSTRUCTIONS

1. All items on this guide must be addressed and a rating given.
2. The lowest single rating given will determine the overall rating for the pump station.
3. A non-Federal pump station located behind a Federal levee will be treated as a separate FCW, and will not be incorporated into the Federal levee project.
4. Additional areas for inspection will be incorporated by the inspector into this guide if the layout or physical characteristics of the pump station warrant this. Appropriate entries will be made in the REMARKS block.
5. Rating Codes:
   - A - Acceptable
   - M - Minimally Acceptable
   - U - Unacceptable

SPECIFIC INSTRUCTIONS

SECTION I. Pump station must have primary purpose of flood control, not interior drainage. District will determine, based on appropriate study, if adequate capacity exists. Lack of adequate capacity mandates a determination of Unacceptable.

**AGREEMENT BETWEEN
THE UNITED STATES OF AMERICA
and**

_____

**FOR REHABILITATION OF FLOOD CONTROL WORKS
or
FEDERALLY AUTHORIZED HURRICANE OR SHORE PROTECTIVE STRUCTURES**

THIS AGREEMENT, entered into this _____ day of _____, 19_____, by and between THE UNITED STATES OF AMERICA (hereinafter called the "Government") represented by Commander, U.S. Army Corps of Engineers, _____, executing this agreement, and _____

_____, (hereinafter called the "Sponsor");

WITNESSETH THAT:

WHEREAS, Public Law 99, 84th Congress, approved 28 June 1955, authorized the Chief of Engineers in the repair or restoration of any flood control works threatened or destroyed by recent floods, including the strengthening, raising, extending, or other modification thereof as may be necessary at the discretion of the Chief of Engineers for the adequate functioning of the work for flood control; in the repair and restoration of any federally authorized hurricane and shore protective structures damaged or destroyed by wind, wave, or water action of other than an ordinary nature when in the discretion of the Chief of Engineers such repairs and restoration are warranted for the adequate functioning of the structure; and

WHEREAS, the Sponsor has requested in writing, assistance in the repair or restoration of the flood control work or federally authorized hurricane or shore protective structure damaged as described by the written request for assistance, and the Sponsor qualifies for assistance in accordance with the established policies of the U.S. Army Corps of Engineers.

NOW, THEREFORE, the parties agree as follows:

1. The Government will perform the work described in its scope of work which is made part of this agreement.

2. The Sponsor agrees, that in consideration of the Government providing assistance, to fulfill the requirement of non-Federal cooperation required by the U.S. Army Corps of Engineers regulations, to wit:

a. Provide without cost to the Government all lands, easements and rights-of-ways necessary for the repair and restoration of the flood control works, and for the use of borrow area and/or spoil areas. This provision will also include the access to and from the flood control works or structures, the borrow sites, and spoil areas.

b. Hold and save the Government free from damages due to the repair or restoration work, except damages due to the fault or negligence of the Government or its contractors.

Figure C-2. Sample C&P Agreement For Rehabilitation

c. Be familiar with the policies and procedures of the U.S. Army Corps of Engineers Inspection Program, participate in the program's periodic inspection, and maintain without cost to the Government the flood control work in a manner satisfactory to the Government and in accordance with the prescribed regulation of the Inspection Program.

d. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the Sponsor owns or controls, for access to the flood control works or structures for the purpose of inspection.

3. The Sponsor further agrees to: (Add as applicable)

a. Contribute, as the sponsor's cost share, the amount and method of contribution as specified in the attachment Sponsor's Cost Share Estimate and Method of Contribution.

b.

4. This agreements remains in effect indefinitely. Termination of this agreement will be automatic when the Sponsor is removed from the U.S. Army Corps of Engineers Inspection Program due to the Sponsor's non compliance with the policies and procedures of the Inspection Program.

5. ATTACHMENTS:

a. Exhibit A - Written request for assistance from the Sponsor.
b. Exhibit B - Government Scope of Work.
c. Exhibit C - Sponsor Cost Share Estimate and Method of Contribution.

6. IN WITNESS WHEREOF, the parties hereto have executed this agreement of the day and year first above written.

THE UNITED STATES OF AMERICA SPONSOR

_____ (Signature)_____

_____ (Name) _____

_____ (Title) _____

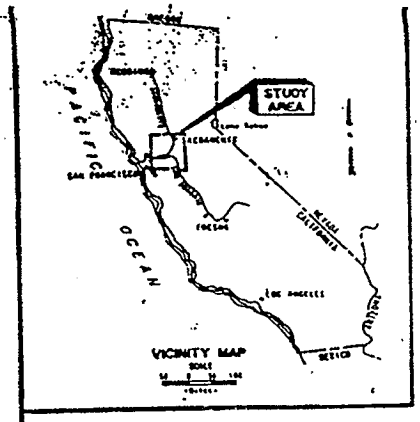
Address:

_____ _____

_____ _____

Figure C-2. Sample C&P Agreement For Rehabilitation (Cont'd)

EXHIBIT B



LEGEND:

THICKNESS (IN FEET) OF ORGANIC* SOILS

- 0–10
- 10–20
- 20–30
- 30–40
- 40+

*Peat, organic silt, organic clay (Pt, OL, OH), mineral soils containing greater than 25% organics.

**Subsidence of organic soils in the Sacramento–San Joaquin Delta, DWR.

SACRAMENTO–SAN JOAQUIN DELTA
CALIFORNIA

DISTRIBUTION AND THICKNESS OF ORGANIC SOILS**

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
JULY 1982

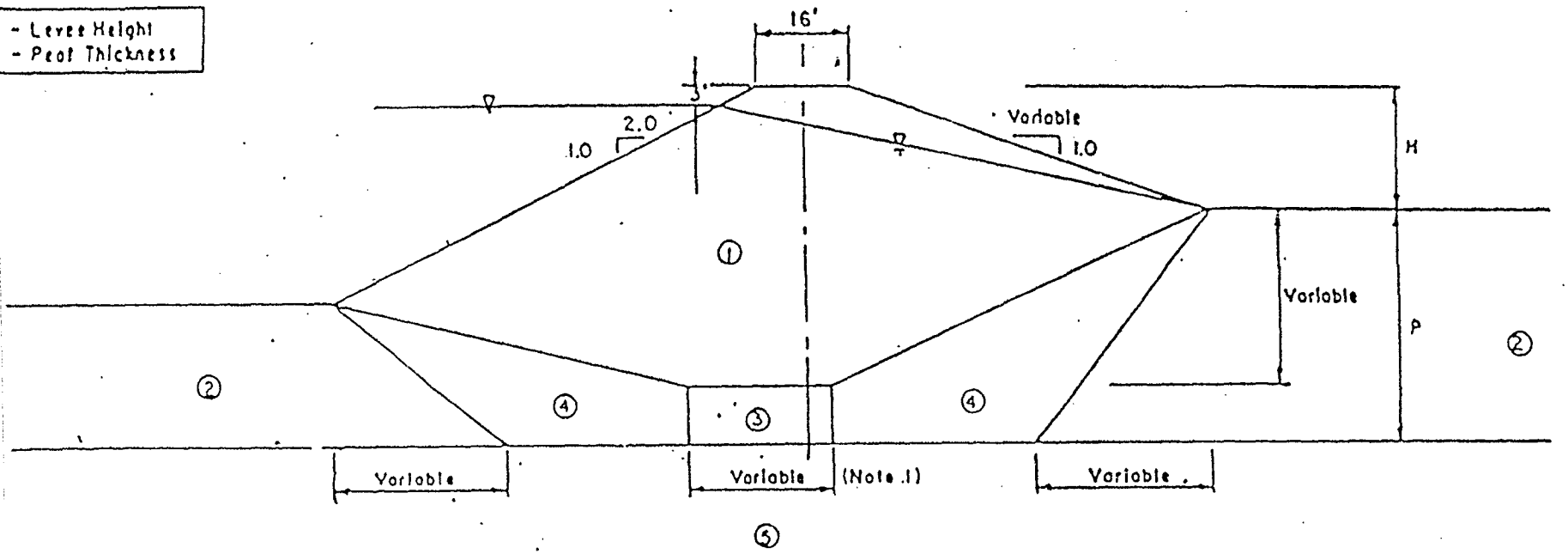
SCALE IN MILES
2 0 2 4 6 8

D—031971

D-031971

LEGEND

- Levee Height
- Peat Thickness



Zone	Material	Moist Wt (PCF)	Sat Wt (PCF)	Strength c (PCF)	Strength ϕ (Deg)
1	Levee Fill - Clay, Sand Peat, Silt	115	120	0	33
2	Foundation - Unconsolidated Peat & Clayey Peat	77	77	100	18
3	Foundation - Consolidated Peats & Clayey Peats	85	85	200	27
4	Foundation - Partially Consolidated Peats & Clayey Peats	85	85	150	25
5	Foundation - Clayey Sand, Firm Sand & Silty Sand	127	135	0	35

NOTES:

1. Dimensions noted as variable, change as a function of levee height and peat depth.
2. References a & d.
3. No distinction is made between peat, organic silt, organic clay, and mineral soil containing greater than 25% organics.

Minimum Levee Geometry
Sacramento - San Joaquin Delta

GENERALIZED LEVEE SECTION
&
DESIGN PARAMETERS

EXHIBIT B

D—031972

D-031972

Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 2(H) LANDSIDE SLOPE

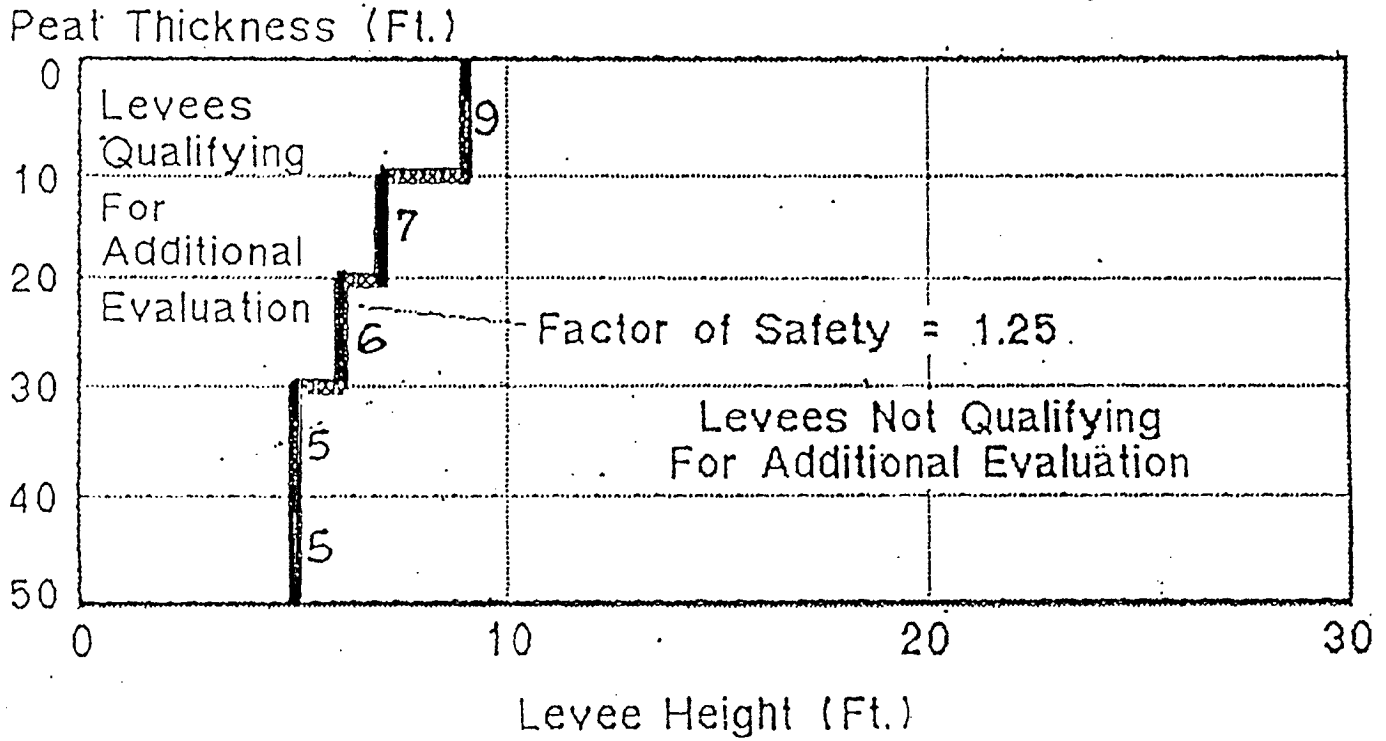


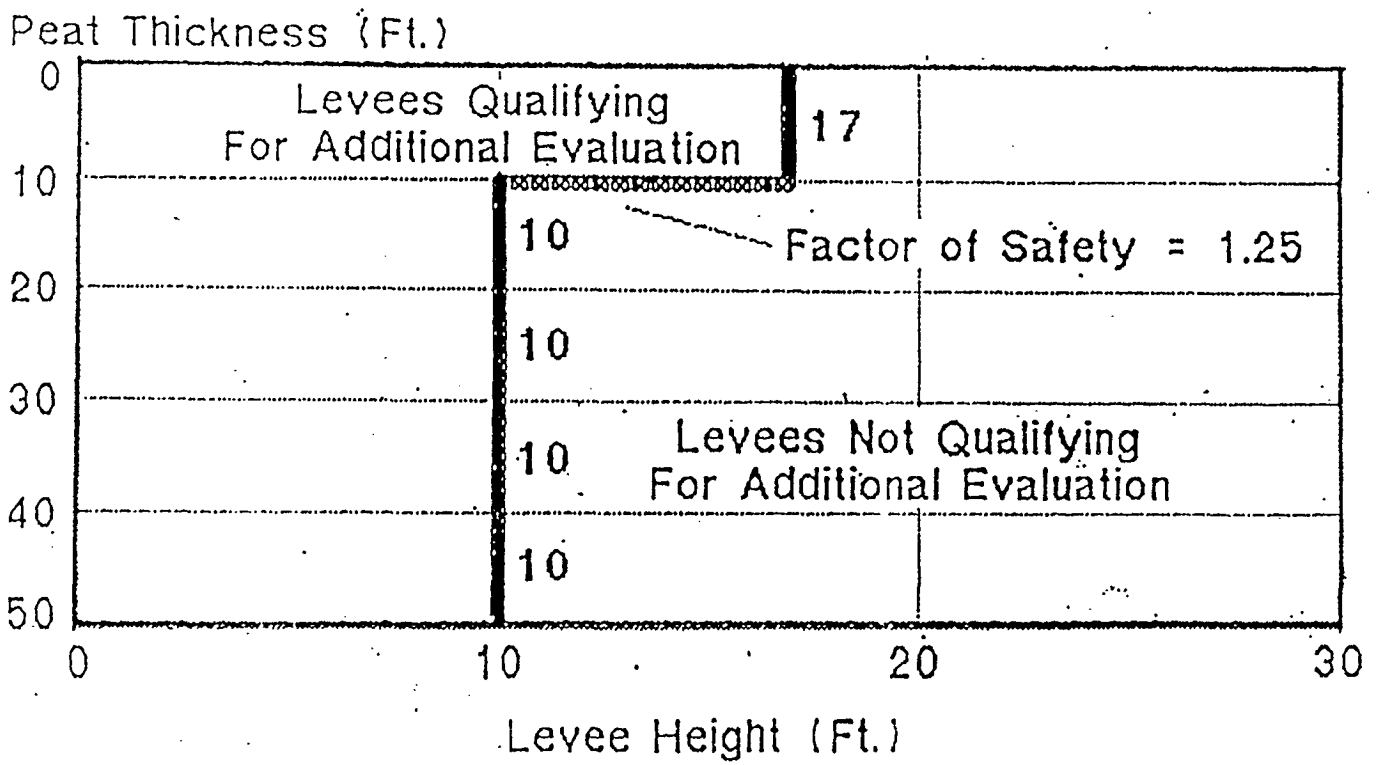
EXHIBIT B

D-031973

D-031973

Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 3(H) LANDSIDE SLOPE



Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 4(H) LANDSIDE SLOPE

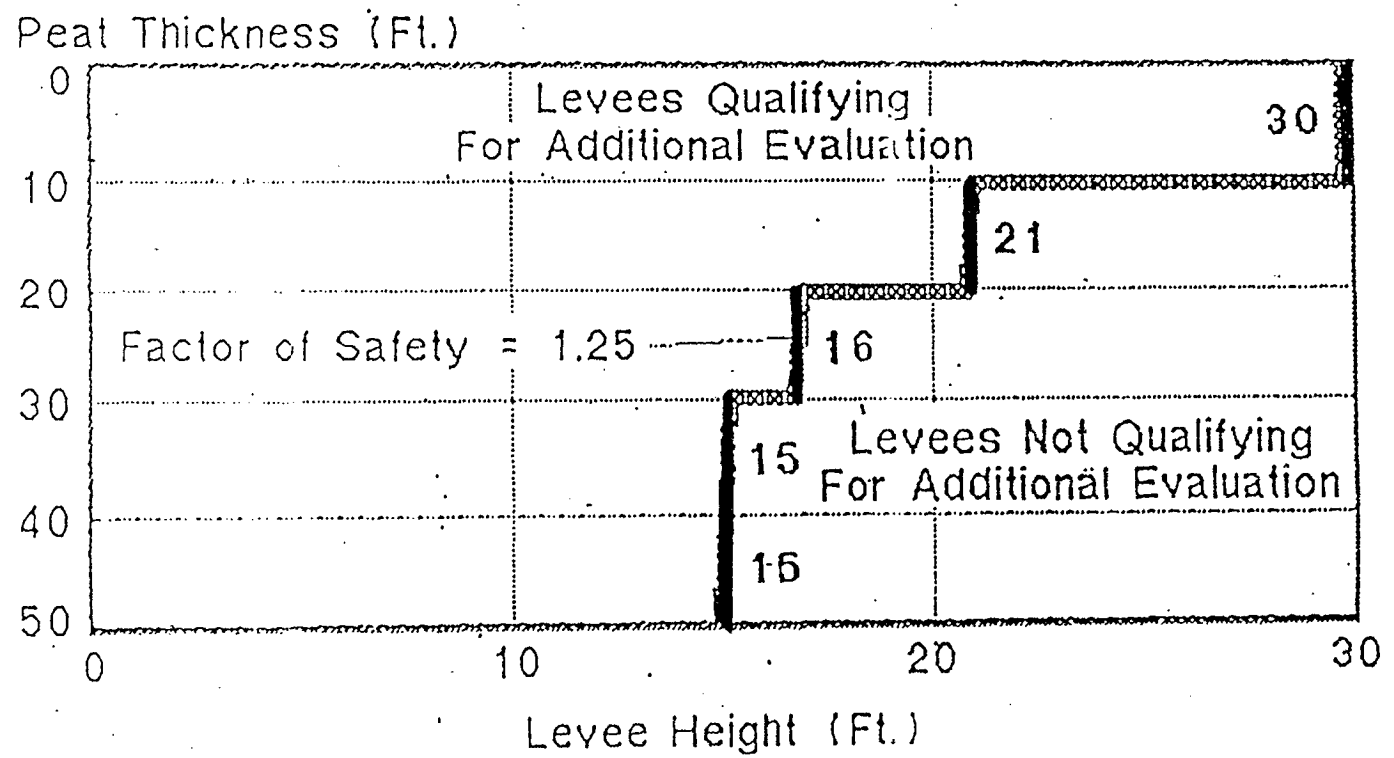
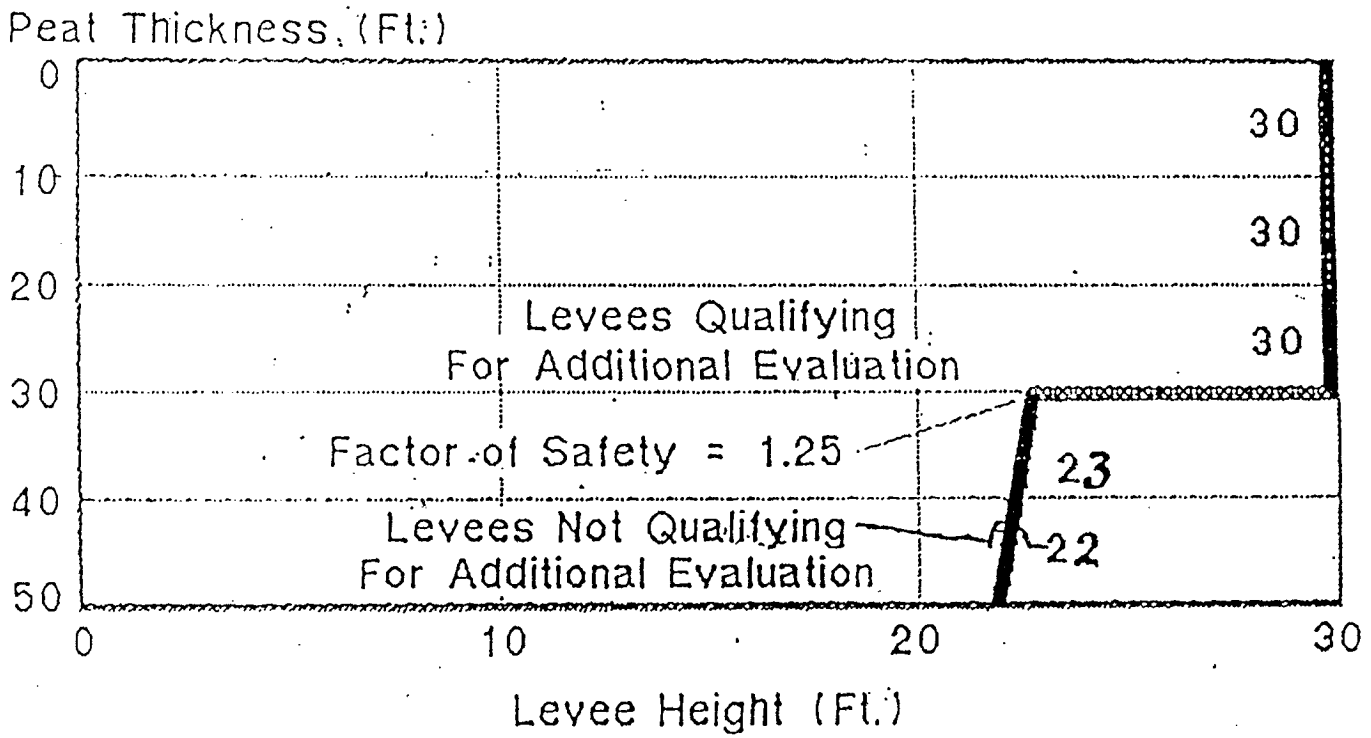


EXHIBIT B

D-031975

Sacramento-San Joaquin Legal Delta
PL84-99
Agricultural and Urban Island Stability

1(V) ON 5(H) LANDSLIDE SLOPE



APPENDIX B
PUBLIC LAW 84-99 AS AMENDED

33 U.S.C 701n. Flood Emergency preparation; authorized expenditures

(a)(1) There is authorized an emergency fund to be expended in preparation for emergency response to any natural disaster, in flood fighting and rescue operations, or in the repair or restoration of any flood control work threatened or destroyed by flood, including the strengthening, raising, extending, or other modification thereof as may be necessary in the discretion of the Chief of Engineers for the adequate functioning of the work for flood control; in the emergency protection of federally authorized hurricane or shore protection being threatened when in the discretion of the Chief of Engineers such protection is warranted to protect against imminent and substantial loss to life and property; in the repair and restoration of any federally authorized hurricane or shore protective structures damaged or destroyed by wind, wave, or water action of other than an ordinary nature when in the discretion of the Chief of Engineers such repair and restoration is warranted for the adequate functioning of the structure for hurricane or shore protection. The emergency fund may also be expended for emergency dredging for restoration of authorized project depths for Federal navigable channels and waterways made necessary by flood, drought, earhtquake, or other natural disasters. In any case in which the Chief of Engineers is otherwise performing work under this section in an area for which the Governor of the affected State has requested a determination that an emergency exists or a declaration that a major disaster exists under the Disaster Relief and Emergency Assistance Act of 1974, the Chief of Engineers is further authorized to perform on public and private lands and waters for a period of ten days following the governor's request any emergency work made necessary by such emergency or disaster which is essential for the preservation of life and property, including, but not limited to, channel clearance, emergency shore protection, clearance and removal of debris and wreckage endangering public health and safety, and temporary restoration of essential public facilities and services. The Chief of Engineers, in the exercise of his discretion, is further authorized to provide emergency supplies of clean water, on such terms as he determines to be advisable, to any locality which he finds is confronted with a source of contaminated water causing or likely to cause a substantial threat to the public health and welfare of the inhabitants of the locality. The appropriation of such moneys for the initial establishment of this fund and for its replenishment on an annual basis is authorized: Provided, that pending the appropriation of sums to such emergency fund, the Secretary of the Army may allot, from existing flood control appropriations, such sums as may be necessary for the immediate prosecution of the work herein authorized, such appropriations to be reimbursed from the appropriation herein authorized when made. The Chief of Engineers is authorized, in the prosecution of work in connection with rescue operations, or conducting other flood emergency work, to acquire on a rental basis such motor vehicles, including passenger cars and buses, as in his discretion are deemed necessary.

(2) In preparing a cost and benefit feasibility assessment for any emergency project described in paragraph (1), the Chief of Engineers shall consider the benefits to be gained by such project for the protection of-

"(A) residential establishments;

"(B) commercial establishments, including the protection of inventory; and

"(C) agricultural establishments, including the protection of crops."

"(b)(1) The Secretary, upon a written request for assistance under this paragraph made by any farmer, rancher, or political subdivision within a distressed area, and after determination by the Secretary that (A) as a result of the drought such farmer, rancher, or political subdivision has an inadequate supply of water, (B) an adequate supply of water can be made available to such farmer, rancher, or political subdivision through the construction of a well, and (C) as a result of the drought such well could not be constructed by a private business, the Secretary, subject to paragraph (3) of this subsection, may enter into an agreement with such farmer, rancher, or political subdivision for the construction of such well.

"(2) The Secretary, upon a written request for assistance under this paragraph made by any farmer, rancher, or political subdivision within a distressed area, and after a determination by the Secretary that as a result of the drought such farmer, rancher, or political subdivision has an inadequate supply of water and water cannot be obtained by such farmer, rancher, or political subdivision, the Secretary may transport water to such farmer, rancher, or political subdivision by methods which include, but are not limited to, small-diameter emergency water lines and tank trucks, until such time as the Secretary determines that an adequate supply of water is available to such farmer, rancher, or political subdivision.

"(3)(A) Any agreement entered into by the Secretary pursuant to paragraph (1) of this subsection shall require the farmer, rancher, or political subdivision for whom the well is constructed to pay to the United States the reasonable cost of such construction, with interest, over such number of years, not to exceed thirty, as the Secretary deems appropriate. The rate of interest shall be that rate which the Secretary determines would apply if the amount to be repaid was a loan made pursuant to Section 7(b)(2) of the Small Business Act.

"(B) The Secretary shall not construct any well pursuant to this subsection unless the farmer, rancher, or political subdivision for whom the well is being constructed has obtained, prior to construction, all necessary state and local permits.

"(4) The Federal share for the transportation of water pursuant to paragraph (2) of this subsection shall be 100 per centum.

"(5) For purposes of this subsection-

"(A) the term 'construction' includes construction, reconstruction, or repair;

"(B) the term 'distressed area' means an area which the Secretary determines due to drought conditions has an inadequate water supply which is causing, or is likely to cause, a substantial threat to the health and welfare of the inhabitants of the area including threat of damage or loss of property;

"(C) the term 'political subdivision' means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to state law and having jurisdiction over the water supply of such public body;

"(D) the term 'reasonable cost' means the lesser of (i) the cost to the Secretary of constructing a well pursuant to this subsection exclusive of the cost of transporting equipment used in the construction of wells, or (ii) the cost to a private business of constructing such well;

"(E) the term 'Secretary' means the Secretary of the Army, acting through the Chief of Engineers; and

"(F) the term 'state' means a state, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American samoa, and the Trust Territory of the Pacific Islands."

Historical Note

Codification. The Department of War was designated the Department of the Army, and the title of the Secretary of War was changed to Secretary of the Army by Section 205(a) of Act July 26, 1947, c. 343, Title II, 61 State. 501. Section 205(a) of Act July 26, 1947, was repealed by Section 53 of Act August 10, 1956, c. 1041. 70A Stat. 641. Section 1 of Act August 10, 1956, enacted "Title 10, Armed Forces", which in Sections 3011-3013 continued the military Department of the Army under the administrative supervision of a Secretary of the Army.

1990 - Section 302 of the Water Resources Development Act of 1990 (PL 101-640) amends PL 84-99 by striking "flood emergency preparation" and adding "preparation for emergency response to any natural disaster." It also authorizes the use of the emergency fund for emergency dredging for restoration of authorized project depths for Federal navigable channels and waterways made necessary by flood, drought, earthquake, or other natural disaster.

1987 - Section 9 of the Farm Disaster Assistance Act of 1987 (PL 100-45) amends PL 84-99 by requiring the Corps of Engineers to consider benefits to residential establishments, commercial establishments and agricultural establishments in preparing a benefit-cost analysis for any emergency project.

1986 - Section 917 of the Water Resources Development Act of 1986 (PL 99-662) amends PL 84-99 by removing the word "drinking" in each place it appears. It also authorizes the Chief of Engineers performing emergency work in a disaster area to perform emergency work on public and private lands and waters for a period of ten days following a Governor's request for assistance.

1977 - Amendment: PL 95-51 approved 20 June 1977, added subsection (b) giving the Secretary the authority to construct wells and transport water during drought situations.

1974 - Amendment: PL 93-251 deleted the specified amount of the emergency fund, and authorized the emergency provision of clean drinking water to any locality confronted with a contaminated source.

1962 - Amendment: PL 87-874 authorized expenditures from the emergency fund for the protection of federally authorized hurricane or shore protection being threatened when such is warranted to protect against imminent and substantial loss to life and property, and for the repair and restoration of any such federally authorized hurricane or shore protective structure damaged or destroyed by wind or water action of an extraordinary nature when such is warranted for the adequate functioning of the structure for hurricane or shore protection.

1955 - Amendment: Act June 28, 1955, PL 84-99, authorized expenditure for flood emergency preparation and eliminated the requirement of maintenance of flood control works threatened by flood.

1950 - Amendment: Act May 17, 1950, expanded scope of work considered under emergency repairs to flood control structures and increased the appropriation from $2,000,000 to $15,000,000.

1948 - Amendment: Act June 30, 1948, added provisions relating to the strengthening, extending, or modification of flood control work.

1946 - Amendment: Act July 24, 1946, increased authorization from $1,000,000 to $2,000,000.

1941 - Section 5 of the Flood Control Act of August 18, 1941 (PL 77-228) established the authority for the expenditure of not more than $1,000,000 per year for rescue or in the repair or maintenance of any flood-control work threatened or destroyed by flood.